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# SCIENCE FICTION\*

MARCH 1950

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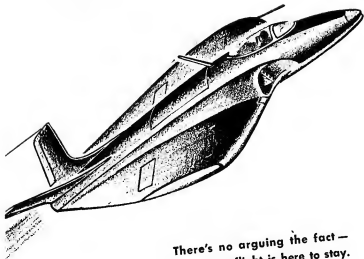
MARCH 1950



**NEW FOUNDATIONS**

by Wilmar H. Shiras

**trail blazer....**



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# Astounding SCIENCE FICTION

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NEXT ISSUE ON SALE MARCH 17, 1950

# OF HUMAN MEMORY

Coming up, and now in preparation, is an article concerning a new science of human thought—*dianetics*. L. Ron Hubbard, well known to our readers as an author, has earned a living writing while spending some twenty-five years doing research on the subject in developing that new material. I assure you of two things: you will find the article fascinating, and it is of more importance than you can readily realize.

At the moment, I want to call to the attention of all readers, and particularly to our readers interested in psychology, one minor point Hubbard has brought out. It is interesting in that five minutes devoted to observation will demonstrate its validity—and its validity neatly upsets several dozen basic doctrines in psychometry and educational psychology. The test observation is very simple, and I recommend it to you now:

Simply sit back, relax, and close your eyes lightly, to reduce the distraction of here-and-now impressions. Remember back to this morning when you left your house or room, recall the little scene where you spoke to someone just before leaving. The exact scene is unimportant; the point is to recall a scene. See that scene in memory—the picture of that person. What color dress or suit or necktie? What color are the objects and background

in that scene? See them in your memory-picture, and notice them. Then *listen* to that person talking—hear the voice in memory, the tones, the sound of the voices. Is a radio playing in the background? Any other sounds present?

That little test should take about sixty seconds; if you have full, normal human memory you can, in memory, see a scene in full color, a sort of kodachrome movie, with sound-track.

Then try another simple memory test. Remember back to the last time you combed or brushed your hair, and *feel* the sensation-memory as an actual perception of the scalp. The memory makes a definite recording of every sensory impression; if your memory is operating fully, sound, vision, tactile, odor, taste—everything—can be fully recalled.

It's a very simple thing to try this on a dozen or so people. You—and they—will be rather thoroughly surprised. Each of us lives so completely within his own skull that it is seldom we question that other people may not live in quite the same kind of a world as we. The psychologists have been more than slightly remiss in failing to investigate and evaluate that fact. Within a day you will discover that roughly one third of the people who try that little test can *not*

(Continued on page 162)



# NEW FOUNDATIONS

BY WILMAR H. SHIRAS

*A meeting of minds is never easy—but a meeting of such minds as the mutant children, with their strained patterns, was bound to be difficult . . .*

Illustrated by Rogers

"And that's the full story to date of Timothy Paul and Elsie Lambeth, the Wonder Children," concluded Dr. Peter Welles, psychiatrist.

Miss Page caught her breath.

"I should have guessed it," she said, "or something like it. But who could have guessed anything like that? Tim seemed like such an ordinary little boy. And even since Elsie came I hadn't dreamed of anything

of such proportions. They didn't seem like super-wonderful intellects, although anyone could see they were quite bright."

"They were hiding from you," Dr. Welles smiled, "under orders. But now that we propose to start a school for these children, and need teachers and matrons, you are the first one Dr. Foxwell and I want. Will you join us?"

"Indeed I will! When is the school to open?"

"We must get the scholars first. I plan to spend August touring the country to see the children and arrange with their guardians. Meanwhile we have been able to write to some of the children and make preliminary arrangements. When I go to the Psychiatrists' Convention next week, I intend to see Jay Worthington. I'm leaving here a day early for that purpose."

He unlocked a drawer—they were talking in his office—and leafed through some papers until he came to those he wanted.

"Here's the correspondence. Jay wrote us that he had seen our advertisement and thought it deserved wider attention, adding that he took a personal interest in the matter. A few days later, his name turned up on the list. The detective agency has by now found nearly all the children for us, checking everyone who was exposed to the radiations, and eliminating those who are known to have died childless."

There was a tap on the door, and two impatient children popped their heads in.

"What does she say?" demanded Elsie.

"She says yes," laughed Peter.

"Can't you talk him into getting started sooner, Miss Page?" begged Tim. "That's a thing I don't understand about grown people. You have so much less time left than we do, and yet you don't seem to think time matters at all."

"Older people have learned to make haste slowly," Dr. Welles replied. "The idea of the school is scarcely a month old. Believe me, Tim, we are as impatient as you are, but things must be planned and done in order."

Elsie moved restlessly.

"If you see the children next month," she complained, "I don't see why you can't start the month after. We don't need all those buildings Tim planned."

Tim was prompt to agree.

"We're already fourteen years old," said he, "and in a few years we'll be grown up and scattered. Let's just have some prefabricated houses put up quickly, and get started this September, can't we?"

Peter Welles shook his head.

"At a week to interview each child and make arrangements with the guardians, it will take months."

"Why a week?" cried both children.

"Because," said Peter somberly, "there may be more difficulties than you can imagine."

"Jay Worthington?"

The boy nodded. "You must be Dr. Welles," he said in a rapid treble voice. "Come right in, doctor." He was vibrating with excitement. A tall, lanky boy, awkward and what Tim's grandmother would have called "high-strung," Jay was clearly bursting to talk. He led the way into the living room, chattering at double speed all the while.

"My aunt's out," he said, "and my

uncle has gone for a walk. I tried to get rid of them, but we'll have to watch out. There is so much to say, I don't know where to begin. But that's for you to say, isn't it, Dr. Welles? There must be something very special back of all this, and a reason for your visit, and for your asking about my parents. The Curtises aren't really related to me, you know; they adopted me when I was ten months old. This is the best chair, and here's an ash tray if you want one."

"Our letters have been brief because yours were," said Dr. Welles, accepting the chair, "and it is better policy. But now by all means let us get to the point, without fencing. You must have a pretty good idea of what this is all about."

Jay bobbed his head vigorously. "I'd rather you said it, though," he replied.

"You answered our ad and said that you had a personal interest in children born in 1959 who were of very high intelligence."

"That's putting it bluntly," said Jay, catching his breath. "I didn't mean to be so plain . . . if I meant . . . I—"

"We're talking straight now. That is what the ad meant, and you knew it. Your name was also on the list given me by a detective agency which has been busy tracing the children born of parents who died as yours did. You know how they died?"

"Yes, the atomic plant explosion."

"Right. Putting these two things together, we knew where we stood.

So Tim wrote to you that we were starting a school for children of high I. Q. and that you would be interviewed."

"That was a body blow," said Jay. "I couldn't see how you knew my age. And then I realized that you hadn't actually said you did know, and perhaps I had misread you. I realized that you might mean you thought I knew some bright children. So I wrote back and said I didn't know any such intelligent children, and then Tim replied that since I was born in the same year he was, I must know some of the things he was interested in. Then I was pretty sure something was up, but I replied with a line saying that perhaps Dr. Hollingworth's books were what he was interested in having, and he answered on a postcard that they were too elementary. And while I was still wondering what to say next the air mail letter came that you would be here a week after my fourteenth birthday with greetings and a message. You seem to know more about me than I can account for, but I still don't know how much you know."

"I'll be perfectly frank. The atomic explosion gave slow death to hundreds of men and women. But before they died, some of the couples exposed to the radiations had children, and some, perhaps all, of these children are mutants of extraordinarily high intelligence. We want to gather them all together, where they can have the benefit of one another's company and develop as they should."

"That is just about as I figured it," said Jay with a sigh of relief. "Tim is one of them, of course? And Elsie?"

"I have much to tell you about them. But let me find out about you first. I know that your uncle is John Curtis the historian. Who are you?"

"Why . . . I'm his adopted son, Jay Worthington. The Curtises had me keep my own name because—"

"That isn't what I meant," said Dr. Welles. "I meant your pen name, or the name you take out patents in, or whatever you do. You don't use your own name for things like that, do you?"

Their eyes met and there was a moment of tense silence.

"You do know, then," said Jay. "I'm James Vernon Worth."

This was too great a shock for Peter Welles to take unblinking. He even gulped. When he could speak again he asked, "Does your uncle know that?"

"Of course not. That's the whole point. If people knew, they would say it was all his work, or that he helped me so much it might as well be. And if he had known what I was doing at first he would have tried to help me. I didn't want that. Of course I have to help him; but that's different."

"You help *him*?"

"Yes," said the boy. "He is blind."

The phone rang while Peter was still trying to take in the implications of what he had heard. Jay, with a

muttered word of apology, dashed out of the room.

James Vernon Worth—this boy? Those three magnificent biographies written by this child? But if he was the adopted son of John Curtis, and helped Curtis with his work—

Jay was back, breathless but talking almost before he had opened the door.

"We haven't much more time," he said. "My uncle will probably be back in a few minutes. He doesn't take long walks."

"Well, here's the situation," said Peter, and he talked rapidly for ten minutes, while Jay listened intently and bobbed his head in eager agreement.

"It sounds wonderful," said Jay at last, drawing a deep breath. "I wish I could be with you. But I can't."

"We'll find some way to arrange it."

But Jay shook his head.

"You see, it's different with me," he explained. "I'm getting along all right. People think it is quite natural for me to know things, for since my uncle's blindness five years ago I have read to him every day, and even before that. And I have always been with people who talked about things all around me. My aunt is a very brilliant woman in her own right. The amateur radio station is really hers. She got it so uncle could talk to people all over the world when he couldn't read any more. Everybody knows they asked for a bright baby to adopt, and the



rest is credited to my environment and upbringing. This is a university town, and people are used to bright boys and they like them. So I don't have to hide very much. Of course nobody knows I write books. But I get along very well. And of course I have to stay with my uncle and aunt. They have nobody but me. And really I'm happy here. There are the dogs to train, for the blind, you know. I didn't train my uncle's dog, Grigio, of course, but we bought Guarda soon after and we train her pups to be guide dogs, and give them to people who need them. My aunt and I train them, and Uncle helps."

A car pulled up in front of the house and a brisk woman, fortyish, jumped out.

"My aunt," explained Jay in all haste. "Quick, please! Come out and look at the pups. We have two for sale now for pet stock. They don't all measure up to be guide dogs."

Peter allowed himself to be led out the back door and to the kennels.

"I see what you mean, Jay," he said, "but we can't leave it at that."

"We must," said Jay. "But we can correspond, and you'll let me know what goes on, won't you?"

Peter scribbled on a card. "Here's my hotel. I'll phone you soon, and we can meet a time or two before I have to leave, can't we?"

"Oh yes—please do."

As the boy knelt down to scratch a pup's head through the wire of the enclosure, Peter's quick eye saw signs of tears.

"We'll arrange it, Jay," he promised.

"No," said Jay, gulping. "I wouldn't go. I wouldn't go if I could. I'm going to stay with my uncle, always."

A few minutes later, after a perfunctory inspection of the pups, Peter Welles went away, feeling greatly depressed.

A telegram signed by Mark Foxwell awaited Peter at his hotel.

"Agency reports another prospect same city. Stella Oates, 432 Vine Avenue."

Peter stared at the telegram for a full minute. And how, he wondered, am I to approach this girl, knowing nothing about her, or her background, or her present home or guardians, am I to walk in without any warning and whisk her off to the other side of the continent? What can I say to her family? How can I get a chance to talk with her alone? Should I phone or write first and pave the way?

But Peter knew that he could not wait. He must see her that very night. The psychiatrist looked at his watch; it was nearly six o'clock. Well, dinner first, and perhaps he could think of something.

At half past seven, ringing the doorbell at 432 Vine Avenue, Peter had still not decided what to say.

Uproar broke out behind the closed door before the bell had ceased ringing. The doctor's trained mind sorted out the sounds and identified them. The crashes and shrieks on

the left sounded like two or three children charging through the same doorway at once, bumping one another and complaining about the bumps. The rapid series of thumps was someone in heavy shoes rushing down the stairs. The slower heavy tread and rumbling voice probably indicated a man trying to restore order, and the quick pattering steps were, very possibly, the lady of the house on her way to the door.

A woman in a gay apron opened the door. A hand behind it pulled the door open more widely, disclosing several dark-haired children in their early teens. In a doorway on the right stood a tall man with a newspaper in his hand. And behind him, in the room he had just left, sat a plump, blond young girl with a book in her lap. So detached was she from the noisy quartet staring and giggling and nudging one another as they hastily retreated, helped by the woman's good-natured pushes—with such a cool disdain did the blond girl view the scene in the crowded hallway—that Peter spoke instinctively to her.

"Stella," he said.

The girl rose quietly and came slowly toward him with a smile.

"You must excuse this rabble," the woman was saying. "They were expecting some friends—"

"That's quite all right," said Peter, and suddenly a worse uproar than ever broke out all around him. In the street behind him a rattling car appeared, honking loudly. To the shouts and screams of the young peo-

ple in the car were added shrieks and yells from the waving quartet in the hall. Dr. Welles moved out of the doorway with all haste; the four shouting adolescents pushed through it and were gone.

"I'm glad Stella wasn't going with them since you want to see her," said the woman. "I'll get back to my dishes, then," and she was gone, too.

Peter turned to the tall man in the doorway.

"Are you Mr. Oates?"

"Yes. Come on in."

"My name is Welles. Dr. Peter Welles."

The men shook hands. Peter began to laugh.

"This reminds me," he said, "of the Queen's advice to Alice: 'Curtsy while you're thinking what to say.'"

"Begin at the beginning," quoted the little girl, "and go on until you come to the end. Then stop."

Mr. Oates looked from one to the other with a blank stare.

"You want to talk to me, too?" he asked. "Is it something about her health?"

"No, Mr. Oates. You are Stella's guardian?"

"Yes. Her uncle. She's my brother's child. Have a chair."

They sat down, Stella's expectant eyes fixed on Peter.

The shabby old house and the swarm of half-grown children decided Peter. The only possible approach was the free-scholarship one.

"It has been suggested," he said, "that Stella might be eligible for one

of the free scholarships that we have to offer."

The man's face hardened.

"First let me tell you who I am," said Peter, smiling disarmingly. "I am a medical man, attending the convention of physicians here this week. At home, I am the psychologist for the city schools of Oakley, California; but I am resigning the position to take charge of a school to be opened there by a wealthy couple, Mr. and Mrs. Herbert Davis, as a memorial to their daughter and her husband. It is their wish that the school educate and care for other children who were orphaned at the same time and in the same way as their grandson."

"In the same way?" repeated Mr. Oates. "You mean the radiation deaths?"

"Yes," said Dr. Welles. "You will find my name in tonight's paper in the list of those attending the convention of psychiatrists here. Let me show you some identification. I can give you the names of local men who can vouch for me."

The tall man looked over the papers which Peter offered him, and nodded.

"The school is to take young people through high school and college," Dr. Welles went on, "and is to open within a few months. The young people must pass certain tests first, and if they do so satisfactorily they may apply for a scholarship which will pay part or all of the student's expenses. I don't know whether you would care to have Stella go so far

away from home, but if you would consider allowing her to take the tests, and she passes them—"

"Are you trying to sell us something or give us something?" asked Stella's uncle.

"If she passes the tests, whether you pay anything at all is up to you," said Peter. "Those who can pay and are willing to do so, pay as much as they wish. You have, I believe, several children of your own to educate?"

"The four you met in the hall are mine."

"Then in your case it could probably be arranged that all of Stella's expenses could be paid by the school. The aim of Mr. and Mrs. Davis is to educate these other children as a memorial to the parents of their grandson. You can easily satisfy yourself that Stella will be in good hands."

Mr. Oates looked again at the papers he held.

"What did you say your part is in all this?"

"I manage the school," replied Peter, "and Dr. Mark Foxwell is associated with me in the work. Miss Emily Page is to be Dean of Girls. One of our prospective students is boarding with Miss Page until the school opens."

"Well, sir," said Mr. Oates, "if all this is as you say, and can be proved to be all right, I don't mind telling you that we might think it over and decide to do it. That is, if Stella likes the idea."

Both men turned to look at the

child, who had been listening without a word.

"I think I would, Uncle Ralph," said Stella.

"Suppose you go along then and make coffee and cut some cake for us," suggested her uncle. "Give me a little while to talk business with Dr. Welles here." He walked to the other end of the room, and Stella came to the doctor's side and said in low, urgent tones: "You were *sent* to me, weren't you?"

"You might put it that way," replied the psychiatrist. What did she mean?

Her uncle was returning with cigarettes and matches, and Stella left the room.

"I wanted her to go so I could speak right out," he said.

Dr. Welles accepted a cigarette.

"The fact is, Stella isn't happy here," said her uncle, "and there isn't much I can do about it. But I tell you fairly, we have no money for expensive schooling."

"No money is needed, Mr. Oates."

"She and her cousins don't get on. They tease her a lot and I can't wonder they do. Stella's notional. Sort of affected. She puts on that superior air of hers, and the other kids don't like it. They torment her and make her miserable. I moved to this house on purpose so she could have a little room of her own, and I told mine to keep out of it and let her things alone. Bits of poetry she used to try to write, they'd read out loud and laugh over. She's a bright little

thing, Stella is, but sometimes sullen. I've often thought if she could go away to school it would be the making of her."

"She is different from her cousins, then."

"Yes, she's a hop out of kin, all right. And she takes a sort of pride in being different, too. I went so far as to have a talk with her teacher about her last May. She told me Stella isn't much like any other kids and she might grow up to be a genius. I favor her all I can, but she's beyond me to understand. She has me get the most outlandish books out of the library for her to look at, nothing a normal child would take any interest in."

"What sort of books?"

"Oh, old languages, with different alphabets, and ancient history, and things about Asia and Africa. No harm in it that I could see, but I don't know where she ever even heard of such things. She does well in school—much better than the rest of them. That shows them up, of course, and they don't like it a little bit. Mine have good heads enough but they're always carrying on and gadding about in a noisy crowd and they don't take any interest in their books. My wife's as good as she can be to Stella, and yet it's hard all around. Mine act up and make a racket on purpose when they know Stella wants to be quiet, and she shows plain she don't like it. She always has her nose in a book. She likes deep stuff, too. She says the others are just like savages. Of

course kids will call names, and mine say she just tries to show off. They say she only pretends to read those history books."

"What do you think?"

"I can't make head or tail of the books myself, and I doubt if Stella can, but it seems to interest her. Now, you see how I'm placed. If I send her away to school at my own expense, mine would feel sort of slighted, you see? They don't grudge their cousin her fair share, and never did, but that would be a good big slice more than her share. I don't have too much to do with. So if there is any way it could be managed so as not to take away from my own children, Dr. Welles, let me tell you it would be a godsend."

"Mr. Oates, I am glad you have told me all this, and I can see your problem," said Peter Welles.

"You said you were the school psychologist where you live," said Ralph Oates, "and I thought likely you'd understand the girl better than we do."

"If you trust her to us, I promise that you'll never regret it."

"I'll want to be sure, you know. Look up your references and all that."

"I'll give you a list of local men who know me," said Peter, scribbling rapidly on the back of a used envelope. "Call these. And others in the West," he scribbled more. "The school will not open for some months," said Peter, who had just had a brilliant idea, "but you can send or bring Stella to us any time.

Miss Page would be glad to take her. Miss Page has been teaching in the public schools of Oakley for thirty years or more; she was one of my teachers when I was a boy. Stella might as well live with her and go to public school as Elsie does, and I will do what I can for her. You think, don't you, that she needs some special attention?"

"Yes, I do. I don't know much about such things, but she doesn't seem to adjust well at school, or at home where she has lived all her life. I think mine will be better off with her gone, and she'll be better off away from them. They're too different to get along, and it gets worse all the time."

When Stella came in with the coffee and cake for which she had been sent, it was already settled that Dr. Welles would spend the day after next giving her the required tests.

Maybe all I'll get is the problem children, thought Peter ruefully as he went back to the hotel. What sort of problem is Stella? We can't do without Jay; but he's right, he can't leave. Is there any way out of that? And what is all this about Stella? As for the convention meetings, which he had come to attend, it looked as if he wouldn't get to many of them. Peter took a sleeping pill and went to bed early.

Mrs. Oates opened the door to Dr. Welles at nine o'clock on the appointed morning.

"I sent the others off on an all-day picnic," she said as she ushered him

in. "My husband was up until midnight night before last, telephoning and sending telegrams. He says to tell you he has been investigating you, and you seem to be all right."

I forgot to ask them not to tell anyone about the children, moaned Peter inwardly. Well, I suppose it was sure to get out sooner or later, but—

"We don't want you to make any mistake," Mrs. Oates continued. "We love Stella like she was our own. I took her when she was a little baby the same age as my Polly and I meant to raise them like twins. But Stella was a different kind of child. Still, that's no matter. We've no more wish to be rid of her than any of the others, except if it's for her own good. Ralph says you told him to satisfy himself about you, and he's doing it."

Yes, but why didn't I think to ask him not to tell why he wanted to know? Peter groaned behind a smiling face. Oh, why didn't I say it was a high intelligence school, and say nothing about the parentage of the children? But how then could I have known anything about Stella? Obviously nobody thinks she is very intelligent. She, like Tim, keeps her intelligence concealed. Peter suffered a wave of horror as he realized that he had, as yet, no proof that all these children were gifted. Then he told himself that Tim, Elsie and Jay surely were, and—what was the woman saying?

"... But I told him maybe you didn't want your affairs talked about,

the school and all, or the children's affairs, their parents or anything, so he never said a word about it."

"Thank you, Mrs. Oates," said Peter in heartfelt relief. "It is true that we do not wish a premature revelation of our plans. Only those most concerned should know about it. We hope to give as little publicity as possible to the school and its pupils. It is not good for children to live in the spotlight." I'm babbling, he told himself, and stopped.

"Well, I told Ralph it's for you to say what you want told, not us. He has a friend in the police department and a friend on a newspaper here. They got in touch with the Oakley chief of police and the superintendent of schools, and asked about you and that other doctor and the teacher you mentioned, and about the Davis people, too. They got night letters and phone calls all day yesterday, your description and your photograph even; I believe they said somebody might be posing as you here and asked if you were here. I hope you don't mind all this, Dr. Welles, but we had to be sure."

"Certainly you had to be sure. I hope now I can use you as a reference when I contact guardians of other children."

"Ralph said to tell you," continued Mrs. Oates, "that if you'd rather take her when you go, and board her with Miss Page, that would save her taking the trip alone so far. We can pay her fare and her board bill, and her board at the school too, if she can have her tuition and books free



like you said. It seems awful sudden to me, but Ralph said you spoke as if you might like it that way. She can always come straight home to us if she doesn't like it there. I wouldn't have it any other way."

"Certainly. And she shall write to you faithfully. But how does Stella feel about all this?"

"The child is wild to go. She keeps saying you're sent to her, whatever she means by that. Of course, she may change her mind again for all I know. She shan't be sent away from here unless she likes. Now, I'll call her; or was there anything else you want to say to me?"

"Only to ask that you allow her to be alone with me for the tests. They are partly psychological, and—"

"I understand that. A child's always distracted if people stand around and watch. What are the tests for? To show she's up to her grade in school?"

"Yes, and to find out where her chief interests and abilities lie, and how well balanced she is, and things of that sort."

"She's up to her grade all right, and in some ways beyond; but she doesn't take a real interest in her studies. She's quick, though, and she has a wonderful memory. There now, she's coming. Come in, Stella. Now you be a good girl, and do what Dr. Welles says, and I'll be in the laundry room if you want me, or the back yard."

As soon as her aunt had gone, Stella sat down opposite Dr. Welles

and asked, "You *were* sent to me, weren't you?"

"Well, I'm here," said Peter. "I think that is enough for now."

Oddly enough, this seemed to satisfy Stella, even to please her.

But when the first pages of the Army Alpha test were set before her, Stella waved it away.

"Puzzles and games like that bore me," she said.

"Have you ever taken a test like this at school?"

"They gave us one once. I couldn't be bothered with it just then."

"The hard parts do take effort," said Dr. Welles.

Stella stared at him.

"What hard parts?" she asked.

"What did you do with the test at school?" asked the psychiatrist. "Push it away like this?"

"Oh, no. You can't do things like that at school. I put down answers to some of it. But really I was writing a poem, so I couldn't take time to bother with puzzles just then. I have to write poems when I'm in the mood!"

Peter took a deep breath and counted ten.

"Are you writing a poem now?"

"No," said the child, her eyes wide.

"If you want to be in my school you must pass my tests," he said.

"But . . . but I thought you *knew*," and the girl looked alarmed.

"I do know," said Peter. "I know a great deal more about you than you



think I do. But we must have some proof."

"Then it isn't because I'm an orphan and somebody wants to be kind to orphans like me. I thought I was right about that," said Stella. "It's something else you want to prove about me. How my parents died is only an excuse."

This speech, confused though it sounded, brought hope to the doctor again. For the first time in this extraordinary interview, Peter felt able to talk frankly to her.

"You have, I believe, a very superior intelligence," he told her. "That is what I want to prove, using several standardized tests."

"Oh well, if this must come first," said Stella. She picked up the pencil, and Dr. Welles looked at his watch.

"Fifty minutes is par," he said. "You can do it in much less."

And Stella did.

"Shall we take another test, or talk a little first?" said Peter when she had finished.

"I'd rather talk. What are the other tests?"

"One of the Stanford-Binet superior adult tests, a Rorschach, and the Bellvue-Wechsler test, and a personality-quotient test."

"I hope they'll be more interesting. Now will you tell me what you came to me for?"

"I think you know enough right now," said the doctor. "Let me find out more about you, Stella. Tell me about yourself. How old are you? Fourteen?"

"I'll be fourteen in October."

"You have lived with your uncle and aunt all your life. Is your health good?"

"Yes."

"Do you sleep well?"

"Yes."

"Do you dream very much?"

Stella hesitated, and said she did not dream; but this was an obvious fib.

"Are your uncle and aunt good to you?" asked the doctor.

"They mean to be."

"Your cousins?"

"I guess so."

Peter asked a number of ordinary questions until Stella was answering freely and then he tried a surprise question.

"What is your pen name?"

"I thought you might know that," she said.

"I know you write. Poetry, isn't it?"

"I'm Estelle Starrs."

Much suddenly became clear to Peter. Among poets, Estelle Starrs was most frequently compared with Emily Dickeson; among novelists, with Marie Corelli. Her first novel had not had a very wide sale, and the second was newly published. Peter had not read them, but he had heard his brother practitioners discussing them with considerable professional interest. "The Star Child" had provoked much argument; and "Incarnation in Egypt," one authority had remarked, must have been written by a slightly wacky wife

of some expert Egyptologist. Naturally nobody had dreamed that the author was a girl of thirteen.

"Who knows you write these things?"

"Nobody. Not even the publisher knows who I am."

"How do you collect your money?" asked Peter.

"They keep it for me," replied Stella placidly. "I couldn't spend it, could I? When I am grown up I can get it. I wrote them I would ask for it when I wanted it."

Peter Welles opened his suitcase again and laid some papers before her. But again the child hesitated.

"I can't take this," she said.

"It's a personality quotient test," he said. "I want to find out what sort of girl you are, your tastes and all that. You can't possibly fail. There are no wrong answers."

"I know what answers I ought to give," she said. "Anybody can see what is wanted. I can't take it and be honest. You'll find out what I am like soon enough."

There was something to that, Peter conceded.

"Just ask me questions yourself, instead of this made-up test," she suggested. "You can tell without asking, can't you?"

"I can tell you some things about yourself," he agreed. "Let's see how well I can do. Pretend I'm a fortune teller at the beach. You believe that nobody understands you, that it is your destiny to live alone forever, and that you will not be appreciated

at your true worth until after you have been long dead."

"I feared that might be true," said the child gravely, "but now that you have come to me, won't everything be different?"

"If you come with me, things will be better for you," Peter replied with equal gravity, "but it may take time."

He put away the test she had rejected, and took out the Rorschach cards. Stella enjoyed this test and chattered freely during it.

"I notice," said Dr. Welles, "that your answers show, as your books do, an interest in Egypt and India and the Orient generally. Isn't this an unusual interest for a girl of your age?"

"Perhaps."

"How did you come to take a special interest in things like this?" he asked.

The child replied stiffly, "It is not permitted me to tell."

The psychiatrist tried another tack.

"How can you tell me about your books, when you can't tell even the publisher?"

"I knew you would believe me," said Stella.

"Wouldn't your family believe you?"

"Possibly. But they would not understand," said the child, with marked distaste.

"How do you get along with your family?"

"I live here as a stranger," said Stella.

"You mean they don't understand you?"

"Of course not. And I have no sympathy with them. We are too different."

Mrs. Oates knocked at the door and called them to lunch. The little girl ate well and normally, and washed the dishes while the psychiatrist talked with her aunt. Then the questioning and testing of Stella was resumed. By the time he was ready to leave, Dr. Welles was satisfied as to Stella's intelligence, and he phoned the airport for a reservation for her on his plane four days later. She was certainly one of the Wonder Children, and she needed his help.

After supper, at this hotel, Peter wrote up his notes. Birth, normal. Infancy, normal. General health, good. Not a "nervous child." (Jay's record would probably be the opposite in that respect.) No serious illnesses. No delusion of persecution, but strong feeling on both sides that Stella did not fit in with the rest of the family. Stella admitted to having had childish fancies, years before, that she might not be related to them at all, but said she now knew better than to think she could be a changeling, a fairy princess, or royalty in disguise. She was sure that she really was the child of Ralph Oates' brother, and thought perhaps her own father and, especially, her own mother, might have understood her better. "Though not entirely," she added.

"Why do you think they would?"

"My uncle understands me better

than the others in this family," explained Stella. "So his brother, my own father, probably would have understood me better yet. My aunt isn't really related to me at all, by blood, and her children take after her. I suppose I must take after my own mother."

"Why wouldn't your own mother understand you entirely?"

"I just don't think she would," replied Stella firmly. And on this she refused to elaborate.

As regards her emotional state, Stella said that she was happier than she had formerly been, since she had begun to have things published, but that she had never expected to be truly happy in such an uncongenial environment.

"My uncle tries to be sympathetic, and sides with me all he can," she said, "but I don't think he really tries to understand me much."

Stella admitted to "seeing things" in the hypnagogic state, but said they "usually don't mean anything. It's like dreaming, only I'm not quite asleep." She showed no sign of any hallucinations, illusions or delusions, and admitted to no more obsessions, phobias and compulsions than are normal in an imaginative, lonely youngster. Her frankness in discussing these matters spoke well for her. She had excellent powers of observation, and could reason nimbly when she chose to do so, but her reading had been very limited because, as she explained, children under sixteen were not allowed in

the adult section of the library at all. Stella was, therefore, limited to the books she could borrow from friends or ask her uncle to get for her. She was overjoyed to hear that in Oakley she could choose books freely from the adult sections.

When she was asked what she would pack to take with her—Dr. Welles' idea being to check on the practical side of her nature—Stella promptly named the necessary articles, described her clothing in terms of summer and winter weight, asked about the climate to which she would be moving, and then suggested that Peter look over her dresses to see which would be suitable to take.

"Your aunt will know that," he replied.

"Please," begged Stella. There was a new look in her eyes, and anxious lines in her face. For the first time she seemed nervous. Obediently, the doctor rose and followed her.

Upstairs in her room, with the door shut, Stella turned to him, and said in a fierce whisper, "You won't tell?"

"No," he assured her, mystified.

"She'll see if I pack them. Please, will you take them—now?"

"Oh! Manuscripts?" he guessed.

"Yes, and notes. If you move that chest of drawers quickly—there's a loose board underneath it, if I pull out a nail. There." And she knelt, reached in under the floor and produced a bundle wrapped in newspaper.

"May I look?" Peter opened the

wrappings and picked up a thin sheaf of papers, fastened with a paper clip, top sheaf of a dozen or more.

"'Mercer's Ethiopic Grammar, with chrestomathy and glossary,'" he read in an awed undertone. "What is chrestomathy, may I ask?"

"It's from the Greek *chrestos*, useful, and *manthanein*, to learn," replied the little girl. "It means extracts from books in a foreign language, with notes, so you can learn."

She reached under the floor boards again and produced a second bundle and a third.

"That's all," she said. "Notes, and a few manuscript poems. Put them all in this brief case—it's my school case, but my aunt will think it's yours. She doesn't notice very much."

Stella indicated the books in the small bookcase by her bed.

"These are story books and poems and things. May I take the books?"

"Your uncle can ship them to you." He could see some of the titles; Stella's three books were there. Her poems were called "Sheaves of Stars."

"*Shh!* Here's my aunt," said Stella, and Peter thrust the three bundles of paper into the brief case, while Stella snatched a dress from the closet and held it up before him.

"You'll need some fairly warm things for next winter, and for the cool nights even now," he was saying when Mrs. Oates opened the door.

"I'll see to it," said Mrs. Oates. "I was going to make the girls some

dresses this summer; I'll send Stella's to her as fast as I can finish them."

Peter Welles, pondering all these things in his hotel room that evening, added a line to his page of notes, and opened the brief case.

"A Conversation-Grammar of the Hindustani Language," he read. "Biblical Hebrew." "Introduction to Literary Chinese." "Arabic Language and Grammar." "An Anglo-Saxon Reader." "Modern Persian Reader." "A Short Grammar of Attic Greek." There were more, but Peter felt unable to face them. He opened the second package. "E. Naville's 'The Ancient Egyptian Faith,'" he read, "Breasted's 'History of Egypt from the Earliest Times to the Persian Conquest.'" There were notes about India, Tibet, Babylon, Persia. Peter looked no more. With a slight shudder, he returned all the notes to the brief case and closed it firmly. Stella should carry it all the way across the continent with her own hands. All those pages of notes in a careful, minute handwriting must have cost long hours of hard labor in secret. These were the odd books she "just wanted to glance over" in which "no child could possibly be interested." These were the source materials for her books.

Peter attended the rest of the conferences he had come to attend. He telephoned Stella daily, but did not see her again. A telegram to Miss

Page telling her to expect the child was followed by a letter giving the story. Peter met Jay almost daily, and talked to him about all they were doing and planning to do, but he did not tell the two children anything about each other. Jay, throbbing with eagerness to hear all that Dr. Welles would tell him about Tim and Elsie and the school, exacted a promise that Peter and the others would write often to him, but steadfastly refused to think about attending the school. It was, he said, impossible, and there was no use in thinking about it.

In the taxi to the plane, Stella asked a question.

"The other children—are they anything like me?"

"Not very much," replied Peter. "I hope you will like them and get along with them as well as you can. But I don't think they will share your special interests to any great extent."

Stella, who had been looking puzzled, looked even more so.

"What do we have in common?" she asked. Peter signed her to silence, but at the airport he walked with her to a place where they could not be overheard and began the explanation and the warning he realized she must be given.

"We are trying to gather you all together because most of you have had difficulty in adjusting to the world of normal children. Naturally the tastes and interests of each child are personal and different from those of the others. Tim and Elsie and

you are as unlike as children can be, except that you all have exceptionally high intelligence. You should be able to adjust to one another if you make the effort, and you can learn from one another and teach one another. It is probable that you all have a wide range of interests, although your special interests are different there must be many things you can share."

Stella looked bewildered, then extremely thoughtful, and then she nodded. What was going on in her mind was more than Peter could guess.

"I'll leave it to you to tell them as much or as little about yourself as you choose," he said. "There is, I know, much that you have not told me."

Thus warned, Stella said little about herself to Elsie or to Tim at first, and even less to Miss Page and to Dr. Foxwell. The children read her published works with some mystification, and she read theirs.

"Tim certainly can do almost everything," she confided to Dr. Welles. "He knows something about almost everything, too."

"But you know more about the Orient and about Africa," he replied.

"It's right what you told me about their having different interests from mine."

"Your interests will widen, no doubt," said Dr. Welles, "and so will theirs. It is good that you have different specialized branches of knowledge to share with one another."

Dr. Foxwell, after this first meeting with Stella, and recalling Peter's letter concerning her, had made a dire prediction that when Stella and Elsie were brought together, the ringing clash between the two personalities would probably resound for several miles. But Elsie was making tremendous efforts to overcome her faults, particularly her tendency to outspoken criticism of everything which differed in the least from her own notions, and she was determined to get along with the other Wonder Children or die in the effort. Stella's habits were rather toward withdrawal than toward violence when she was not "understood," and as for Tim, nothing human was alien to that ardent would-be psychiatrist. To all three children, what really counted was that they had found others of their own age who were of the same mental level, and they were eager to share their interests and to help one another. Their clashes were indeed frequent, and misunderstandings rife, but the bond which bound them together was stronger than their differences.

Dr. Welles was conscious that Stella had something on her mind and that she was trying to think something out. It seemed that until she had done so she was avoiding any definite statements except those of indisputable fact. She often stared at the others as if puzzled, and they seemed puzzled about her.

For the first fortnight, Dr. Welles made no effort to quiz Stella, but left

her largely to the society of Elsie and Tim, and observed her as much as he could. Offered her choice of a pet, Stella said that since all the others were breeding cats she would be content with only one of her own, and she chose a coal-black, short-haired, green-eyed tom which she had neutered. She named it Hegai; and Peter Welles had almost as hard a time tracking down that name as he had in identifying the Grigio for which Jay's guardian's guide-dog was named. Stella and Elsie went almost daily to the main library and returned loaded with volumes. Miss Page privately kept a list of the titles.

"There is no point in the reading that I can see," she reported to Dr. Welles. "Stella is going on a sort of reading jag, reading anything she lays her hands on; and Elsie is going through the library and reading everything they didn't have in the library in her home town. They each read most of what the other brings home. I should think it would give them both colic."

"And are they getting enough exercise and play?"

"Oh yes, I see to that. And Tim comes over nearly every afternoon, or they go to play with him."

Elsie spent one evening a week with Dr. Welles and one with Dr. Foxwell. Tim no longer had professional consultations with the doctor, and both of the doctors were extremely busy, for Peter had not yet given up his work with his patients, and Dr. Foxwell was occupied

with business affairs connected with plans for the school.

"How do you get along with Stella?" Dr. Welles asked Elsie one evening.

"All right," said Elsie. "Sometimes she makes me mad, though. She did today."

"Tell me about it."

"We read each other's stuff, of course," Elsie said, "and when I showed her a sonnet sequence, she said it was wordy and stylized. *Wordy!*"

"I haven't had time to read any of her poems yet. What are they like?" inquired the psychiatrist.

"She has a new one she calls 'Figures.' Figures of speech, she means. No rhyme, nothing much to them. Just little short things."

"Well, I suppose a person who calls sonnets 'wordy' would have to write very short things," smiled Peter. "Can you repeat one?"

Elsie struck a pose and declaimed:

" 'Branches of trees out-  
stretched—

Your arms.

I am a timid bird

Huddled in them.' "

"Is that all?"

"The rest are like that. Or worse. So, of course, I didn't show her my new sequence, the Summa one." The last sentence was sarcastic.

Elsie and Tim had been reading the Summa Theologica. Tim, as the psychiatrist knew, was most impressed by its mathematical quality, and kept saying that it ought to be possible to reduce it to equations, if





one could but find the right symbols. But Elsie saw it as a work of art, each question-section as concise and disciplined as a sonnet; and she was actually engaged in turning out examples of what she meant—each objection expressed in the octave, the reply and answer to the objection in the sestet. This exquisitely difficult task was her most cherished secret; no one knew of it except Dr. Welles.

"And how is the Summa sequence getting along?"

"Terrible!" Elsie's eyes were bright with enthusiasm. "I have to set every word in place like . . . like God setting the stars in the sky. I'll never get even one of the sonnets to suit me. It's better poetry in the original. But it is fun to try."

What odd definitions these children had for *fun*, mused Peter.

"I remember another of Stella's things," said Elsie, and she repeated it:

"I am the dull earth,  
You are lightning,  
Tying me to heaven  
An instant."

"She does it well," said Peter, with some severity. "You can't say it is not poetry."

"Yah!" said Elsie, with great simplicity. "She gets a good idea or phrase and she throws it on to paper and that's all there is to it. She doesn't work with it, that's what is wrong. But what can you expect? She believes in inspiration."

Her head held high, Elsie left the consultation room, and the psychia-

trist was left with his thoughts.

After a few moments he picked up the telephone and called Miss Page.

"Hello? Peter Welles speaking. I think we'd better give the children a little studying to do this summer . . . No, nothing burdensome . . . An essay to read together and discuss was what I had in mind . . . Yes, you're right, there's a reason for it . . . Poe's 'Philosophy of Composition' will do to start with."

"How he wrote 'The Raven'?" Miss Page's voice came over the wire. "It will be worth the price of admission to hear what they say about it."

"Give them each a copy tomorrow after supper, or as soon as you can get three copies," Peter directed, "and let me know beforehand. You and I have some work to do while they read."

So a few evenings later, Dr. Welles and Miss Page ostensibly busied themselves with plans and calculations at one end of the living room, while the three children, curled in easy chairs or sprawled on the floor, read the essay and exploded into talk. Never was a man more thoroughly disagreed with. And yet it soon became apparent that there was considerable disagreement among the children themselves. "It depends on just what he means," they often remarked, but they doubted whether masterpieces were often written backwards, and even more did they question whether Poe actually wrote as he said he did.

"I think he rationalized it afterwards," Tim insisted, while Elsie was inclined to think the essay an elaborate hoax, and Stella considered it a defense against "those fool people who keep asking you how you do it, and wouldn't understand if you told them."

All of the children jeered at Poe's remarks about Beauty, not even Stella being willing to concede that Beauty makes one weep. Tim stoutly maintained that death is not a very melancholy topic to a Christian, and Elsie couldn't see anything beautiful about the loss of a loved one, "especially if you howl about it all your life." To the surprise of the listening elders, all three children thought that Poe greatly exaggerated originality.

"Only people who don't know much and have never read much think you can ever be original," said Elsie.

"Yes, almost everything possible was done or thought thousands of years ago," agreed Stella, "in a literary way, I mean."

"It's a sort of pride, I think," Tim mused. "As if to say, nobody else in all creation has ever had a mind as good as mine; I can think of things never thought before."

"Well, he does admit that it's only the combinations that can be original," Elsie pointed out. "Like his stanza form."

"Yes, but I bet that could be duplicated if you hunted long enough," said Tim. "Let's keep our eyes open

for that kind of stanza when we read."

"Poe tries so hard to be gruesome that half the time he's only funny," Elsie said.

"The silly old raven would soon starve to death sitting on that bust," giggled Tim. "I think the poem is much too long, too; and the refrain dates it."

The girls disagreed with him there. There were times, said Elsie, when a refrain belonged in a poem, even though it had been done to death in some periods.

"But the whole essay is all wrong," said Stella heatedly. "It makes it all so mechanical. We couldn't write that way, and I don't believe anybody could."

"Maybe if they didn't write anything very good," said Elsie. "'The Raven' isn't really good."

"I should think you'd be too busy with the mechanics to accomplish anything," said Stella. "And he doesn't say a bit about imagination."

"I read something else of his once," Tim frowned as he tried to remember it, "how he chose the name Lenore by choosing the most musical consonants and vowels and combining as many of them as he could in one name, or something like that."

The girls shouted.

"Well, if he doesn't know how to write without all that rigmarole," Elsie said violently, "he's not much of a writer."

"He doesn't claim to be inspired," said Stella.

"But he's always talking about intuition," said Elsie, "and he doesn't much like it."

"What is intuition?" asked Tim briskly. "And inspiration that some writers used to believe in—do you?"

"Of course I do," said Stella indignantly. "That's how I know Poe wasn't really a poet. He doesn't even know what inspiration is. He works like a robot."

"Well, I don't know what it is, either," retorted Elsie, "I just work until it comes out right. And I don't work like a robot at all."

"No, of course you don't," Stella said. "But I think you work over things too much," she added kindly. "Why don't you put your things down as they come, unspoiled?"

Elsie gaped at her.

"Just *raw*?"

Tim, who had never written poetry, was intensely interested. The adults, who had been completely forgotten, had long since given up the pretense of work.

"You don't write the way he says, do you?" demanded Stella.

"No, of course not," replied Elsie, "but I don't claim to be inspired. What do you think, Tim?"

"Well, isn't it possible," said Tim, with an excellent though unconscious caricature of Peter Welles' professional manner, "that Poe really did go through all that he says he does, very rapidly indeed, and then went back and analyzed it and described it as if it had been deliberate and purposive? Your thought processes are so rapid, Stella, that

you probably don't know you think at all, it seems to come in one burst."

"I know it's inspiration," said Stella firmly. "I write poems that aren't like anything I ever thought. They come to me. I woke up one night last week and wrote a long one and it amazed me. It wasn't at all like anything I had ever thought in all my life, and at first I couldn't even understand it. But it had great meaning for me—although maybe not for anyone else."

"If it had such great meaning for you and for nobody else," said Elsie, "it must have come from something in yourself—your own experiences and thoughts—so it couldn't be inspired from outside yourself."

"Like dreams," suggested Tim. "Sometimes you can't figure out where they come from, but . . . Peter can tell us!" he cried confidently, remembering the presence of the grownups. And the children all rushed across the room, shouting questions in chorus.

"Professionally, I know nothing about inspiration," Dr. Welles answered. "My patients do sometimes suffer from hallucinations in which voices speak to them; but you mean something rather different. Miss Page, may we consult your dictionary? Ah. Here we have it. From *inspirare*, to blow upon or into, to breathe into. 'To fuse or suggest ideas or monitions supernaturally; to communicate divine instructions to the mind.' In this sense we speak of the writers of Sacred Scripture

as inspired. They wrote under the guidance of God."

"That wouldn't apply to our poetry, surely," said Elsie to Stella, who flushed hotly and made haste to agree.

"To infuse ideas or poetic spirit," read Peter. "It doesn't say by whom this is done. Who or what inspires your poetry, Stella?"

The child looked stunned.

"I don't know. I never thought about that."

"Well, I don't understand about the Bible," began Tim, but the doctor silenced him.

"Leave that for now. It is irrelevant. Well, Stella?"

As Stella did not answer, Elsie took it upon herself to do so.

"I should think that's the whole point, *who* inspires you," she said. "I wouldn't want to be dictated to by just anybody or anything. It might be a hallucination, or a demon, or my own imagination. I think it's just ideas that come into your head and you don't stop to think where they come from, but they all have a natural explanation."

"Might be largely unconscious or subconscious, as in the case of dreams," suggested Tim. "Then it would be hard to track down sometimes, as dreams often are."

"Yes, and if you get a good idea you don't stop to fret about the psychology of its coming, you just grab it quick before it gets away," Elsie volunteered. "What about intuition, Dr. Welles? Do you know?"

"About that I think I do know and

can explain. There are, in what Jung calls the psyche, four basic functions, of which intuition is one."

"The psyche? Does he mean, soul?"

"More or less. Jung's term also includes the unconscious. Terminology differs considerably. Poe referred, you notice, to . . . where's the place . . . 'the object Truth, or that satisfaction of the intellect, and the object Passion or the excitement of the heart.' The scholastics say that the soul has intelligence and free will; the intellect seeks to know, to grasp the truth, while the will desires happiness. Love resides in the will."

"I thought love would reside in the emotions," interrupted Elsie.

"Depends on the definition," Tim said promptly.

"It is impossible that the human will be deeply moved by an object, says St. Thomas Aquinas, without passion being aroused in the sense appetite. Spiritual love flows from the will, and the emotions and sense appetites follow along with it. In all these matters we must understand the words as they are meant, and recognize, on the one hand, identity of thought under difference of terminology, and, on the other hand, difference of thought in many cases where the words used are identical. The word love, for example, has many meanings."

Miss Page marveled anew at the children, who were drinking it all in with concentrated interest.

"What Jung calls 'thought' corresponds to what Poe and the scho-

lastics call 'intellect' and others call 'reason,' and this function evaluates by means of cognition from the viewpoint 'true-false.' Is that clear?"

"Yes. Go on," chorused the children.

"What Poe calls 'passion' and the scholastics call 'the will' is what Jung calls 'feeling' which evaluates by means of emotions, he says, from the viewpoint 'agreeable-disagreeable.' We choose, or love, or desire, what seems *good* to us, in other words."

"Morally good?" asked Tim.

"Any kind of good. Good art—good pie—a good time. The will chooses a thing under its aspect of good, invariably—because of the good in it. It may be morally bad to take a pie, but you may take it because it is a good pie. Now the two functions of the psyche are called rational functions, because they deal with values. Sensation and intuition, on the other hand, are called irrational, because they work with mere perceptions. Sensation takes things as they are, without valuing them or thinking about them."

"But people do think about—"

"Yes, but that's using another function, you see. The sensation type of person will look at a picture or a landscape and see the details—name the trees, the colors of the different flowers, and all that; or he notices an event in the same way, but not the significance, the meaning of things. Such a person in an art gallery will count the cherubs flying about a saint's head, and think you are

lacking in observation if you cannot tell how many there were. Intuition also perceives, but in a special way, seeing the inner meanings and the potentialities of things, getting impressions rather than definite, photographic details. Where's the dictionary? Oh, yes. 'The act of knowing by direct perception or comprehension, without reasoning or deduction; a first or primary truth; insight; apprehension.'"

"But if it concerns truth, why is there no reasoning or deducing?" Tim wanted to know.

"The axioms, and so forth, which are prerequisite to the reasoning process, must come from somewhere," explained Dr. Welles. "Self-evident truths, as we sometimes call them, are too simple to be demonstrated. The axioms of geometry, the first facts such as 'I exist' and 'I think' are known directly. You'd better all have a go at a textbook on Criteriology—Glenn's is on my shelves somewhere. This is the study of the tests and norms by which one may judge what is true and certain in human thinking, reasoning and knowledge. Now, to get back to intuition as it is often used the word refers to a guess, hunch, or even an impulse which may be false or evil. You may think you know intuitively that you can trust a certain person, and he would steal your last cent. I'm not the intuitive type myself. But a thing may be perceived intuitively and then checked by reason. There are men of the intuitive type, of the thinking type

and of the intuitive-thinking type. Similarly a thing may appeal to the senses and then be rejected by the will. The pie which would be taken at the dictation of the senses because it is good to eat, might be rejected by the will, which seeks a higher good, a moral good. We might go into all this at length"—Dr. Welles glanced at the clock—"but I see it is time for Tim to go home, and rather too near bedtime for you girls."

"Imagination," pleaded Elsie. "What's that?"

"Just very briefly," wheedled Tim.

"Oh, imagination is the power by which we recall or project images of things the senses have perceived. St. Thomas says it is the ability to picture material things in their absence. Jung calls it a creative power which brings up an image out of the material of the unconscious. You can not imagine what you have not first seen, but you can combine different images into one. If you wish to imagine a mermaid, you combine a woman's upper part with a fish's tail. Or if you try to imagine a scene on Venus or Mars, you might think of a plant shaped like grass, the size of a tree, colored like the sky, with a flower like a cat's head, having eyes like a bee and feelers like a snail. Do you understand me?"

"You mean we can't imagine anything?" cried Stella.

"It's like Poe's originality—only the combinations can be original?" Elsie exclaimed.

"Of course, a man born blind can't imagine red or blue," said Tim. "Try

imagining a new color. Go on, try."

"Well, think it over and read up on it," advised Dr. Welles. "I'll lend you books if you like. Good-night, all of you, please! Miss Page and I will finish off our work here."

The girls went up to their rooms, and Timothy left the house.

"What in the world will they make of all that?" Miss Page wondered.

"Tim understood, and Elsie got most of it," Dr. Welles replied. "What Stella thinks is the question. I'll let it all soak in for a while, and see what comes of it."

"They are all so different."

"Yes. And Jay is unlike them all. He tells me in his last letter—I forgot to bring it along—that he has learned several languages. It seems that when his aunt first began to read aloud to his uncle, because of Mr. Curtis' failing sight, Jay demanded lessons. His aunt gave him a month's instruction with special emphasis on pronunciation, and after that he could read German aloud and said he wanted to learn another language. Apparently they still think he does not understand what he reads and has merely learned how to pronounce the words to help his uncle, as a singer learns to sing in several languages without knowing or caring what the words mean. Actually he reads German, French, Latin, Spanish and Italian perfectly, and is eager for a chance to try speaking and writing them."

"How Tim would love to be with Jay!"

"Yes. We must think of some

way to get Jay here. We need him, and I think we have much to offer him, too."

"If he would come, under the circumstances, I wouldn't want him," said Miss Page.

"That's the problem," said Dr. Welles.

"Hello, Stella."

"Hello, Dr. Welles. Miss Page said you wanted me."

"Come right in." Peter offered her a comfortable chair and set a dish of candies temptingly close while he talked. "I plan to have private talks with each one of our pupils fairly often, and help you with any problems you may have. Now that you have had a while to get settled here and get to know us all, we may as well begin our talks."

"Yes, sir."

"Is everything going all right? Are you happy?"

"Oh yes, Dr. Welles," replied Stella. "It's so interesting here. Miss Page is so good to me. And I can read all I want to."

"No troubles at all?"

"No, none at all."

"What have you been thinking about lately?"

"I've been thinking about what we were all saying about inspiration, and Tim gave me some books to read about dreams and their origins," Stella said, "and I think you must be right. We've been talking it all over. One thing I like best," she added in a burst of confidence, "is that even when they don't agree with

me or understand me, they never act mean. I wrote a poem in which I compared myself to a timid bird, and my cousins or any other kids I ever knew would have chased me around for weeks yelling, 'Hey, timid bird!' and making all kinds of fun. But Elsie knew what I meant, even if she didn't care for the poem. She's quite blunt, but she takes things the way they are meant. And Tim is awfully kind. Even when they call me crazy, they don't act as if they're glad of it."

"Then you have no problems to set before me right now?" said Peter, making no comment on this innocently revealing speech, and giving no sign how much it had moved him. "Let's talk, then. Suppose you tell me, what is your philosophy of life?"

Tim would instantly have demanded a definition of the phrase. Stella only looked thoughtful.

"I never formulated one, I guess," she said. "I'd have to think about it. I never heard that expression before."

"Would you say your philosophy is simple or complex?"

"Fairly complex, I think."

"But don't you think a simple philosophy would be easier to apply?"

"Well, yes, but one must begin with a complex philosophy, because life is so complex, and the philosophy must fit it," said Stella carefully. "Perhaps it will simplify after a while, when I understand things better."

Dr. Welles nodded slowly three or four times.

"Suppose you tell me how you account for your being so different from your cousins and from other children."

"Right now I'm not sure about that. Tim says it's the radiations. But I don't understand such things. I had a theory worked out, but—" Her voice trailed off into silence and she looked doubtfully at Peter.

"I'd like very much to hear it," said the psychiatrist.

"I'm not sure you would understand."

"I'll try." Humanly speaking, there was nothing Peter Welles loathed so much as a person's assuming that he or she was too wonderfully unique to be understood. Professionally he was used to it.

"Timothy said that if nobody else thinks the way you do, you must be wrong."

"Well, suppose you tell me what your theory was, and how you came to formulate it, and what reasoning and evidence support it, and what is against it," suggested Peter encouragingly. He scratched a match and gave his attention to his pipe for a moment. The child spent the moment in concentrated thought.

"Cutting out inspiration made things a little simpler," she said, "but there are still so many complications and alternatives; perhaps you can help. I'll try to tell you. Where to begin?" she murmured, and then plunged in. "I guess it began when I was first taken to a museum. Pete was taking ancient history in school and Pat had to visit local points of

interest, and my aunt took Pokey and Polly and me along. They ran around saying, 'Isn't this funny?' and laughing like anything, or else they were bored stiff and wouldn't look at all. They chattered and squealed so—"

"I know," said Dr. Welles, when Stella paused and gave him a look that begged for understanding.

"Either they all ran off, and left me, or I slipped away, and there I was alone, wandering around in the great dark rooms and able to look quietly at everything as long as I liked."

"Dark?"

Stella frowned and tried to recapture the scene.

"They seemed dark. There was light to see by, of course, but it was shadowy. There were mummies and vases and things, and I wandered around for what seemed like a long time. Then I found myself before a great piece of stone with writing on it that I recognized as Egyptian. It was high and wide and solid, and for a flash I could remember it all. I knew I had been there, in Egypt, and had seen it many times before."

The child had lived the moment again as she spoke. Then she looked up, defiantly yet fearfully at Peter, who pulled silently at his pipe, his face without expression.

"That was the beginning," said Stella, and she waited for comment.

"Go on."

"Then I went into other rooms and saw other things. It was the



same with cuneiform, almost. I almost remembered how to read it, although I could not remember seeing those particular inscriptions. Then the others found me and we went home. Oh, how they always chattered. So silly. Anything even a little bit different they thought was funny and would scream over it. Pat used to take care of children and she would show them pictures and say, 'See the funny man. He's all black. Isn't he funny? Look at the man with feathers on his head. Isn't he funny?' and if they passed a Chinese on the street they'd nudge each other and say, 'Look, look, isn't he funny?' What's funny about that?"

"Nothing whatever," said Peter, with such unexpected warmth that Stella took heart and went on.

"Then I asked my uncle about books on ancient times and places and languages and he would try to get whatever I wanted. He asked for story books first and when he brought me Haggard I was sure I was right. He took me to the museum again, without the others. At the library we got books about the different languages and I began to learn them again."

She seemed to expect comment, but the psychiatrist's nod was non-committal.

"I got books in Arabic, Chinese, Hebrew, Greek, Hindustani, Sanskrit, Anglo-Saxon and Sumerian."

"Sumerian!"

"Yes. C. J. Good's 'A Sumerian

Reading Book.'" Stella's eyes were shining. "Some of it is in cuneiform script."

"I see. Go on."

"So I came to work out this theory. I couldn't see that things made sense any other way except that I must be reincarnated and have a sort of memory of these other lives, unless I was inspired, and now I'm pretty sure it's not inspiration. Other boys and girls had no interest in these things; why should I have? They didn't think about things like life and death and time and personality and other religions—or even their own religion. How could I be so interested and know so much, and learn so fast, if it wasn't partly remembering? And stories I read backed me up. Kipling and—"

"Is there no other possible explanation?"

"I can't think of any. The other children wouldn't agree with me, I know, but I think they are the same as me only they don't know they are remembering anything."

"Do you believe this theory implicitly?"

"No," said Stella. "Sometimes I thought I was positive. Once I asked our minister if reincarnation could be true, and he said he didn't know. He said he once saw a little whirlwind moving along, and when it came to a haystack it took on a body of whirling hay, and when it crossed the road it took on a body of dust, and if it had come to a pond it would have been a waterspout."

"In other words, yes?"

"He meant 'maybe.' But the analogy didn't seem quite right to me. It's good poetry, but after all, a philosophy of life isn't only poetry. Poetry is true, of course, but you never know quite how it is true or where it is true. It doesn't have fixed limits like material things. You can't build your whole life on a lyric idea. Besides, I told my uncle and he was furious."

The psychiatrist began to like Stella's uncle.

"How much did you tell your uncle of all this?"

"Nothing. I just told him I liked ancient history and things. He told my aunt it was an odd taste but harmless."

"You said that on your first visit you recognized Egyptian writing," said Peter, laying a little trap.

"Well, I had seen some in Pete's history book," Stella said candidly.

"Have you worked out a time schedule for the various incarnations? Is this the first one in the Americas?"

"I don't know anything about all that. I don't really remember much, if anything. It's that it all seems to come back to me as I see it again. And there is my poetry. It's beyond my years, certainly. The critics all say it shows extraordinary insight. If it isn't inspired, then I must remember from past lives, to be so much older than my years. And you said we can't imagine anything we have not seen, so that simplified things even more."

"Go on."



"That's all. What do you think? Am I all wrong about this?"

"Do you want my honest opinion, Stella?"

"Yes, I do."

"I think you have worked it all out very intelligently," he said slowly, "and I quite understand how you came to do so. But I do not think your theory is true at all. I think you wished to be away from where you were—to live away from where you lived—didn't you? And you were especially eager to get away from the others at the museum. You worked yourself into a semihypnotic state wandering about alone in the shadowy galleries—a half-dream state. Many people have been very deeply moved, or greatly thrilled, at seeing things from these ancient civilizations. Their antiquity appeals strongly to the imagination. Probably the history book was your first glimpse of a world beyond your everyday life. You mistook the thrill for a stirring memory. Did you ever remember anything you had not seen or read of in this life?"

"No. Not that I could prove, anyway."

"Nothing you are positive of, you mean? I thought so. The books you read and also those you wrote were an escape from what you were living every day, as far away as possible in space and time, and they were also an outlet for your creative energy and imagination, your impulse to write stories and the like. 'The Star Child' shows at least the wish to believe that you did not actu-

ally belong to the family, that you came from some other source entirely."

"I knew better by the time I wrote it," Stella said defensively. "But it made a good story, I thought."

"Of course it did. And 'Incarnation In Egypt' shows the wish to live somewhere else, in as different a world as possible. You must have enjoyed living in Egypt in your thoughts, reading and writing about it."

"Don't you think reincarnation can possibly be true?"

"It has a powerful appeal to the imagination," replied Dr. Welles. "It promises a sort of immortality to those who can think of no other; but I don't see much use in living many lives if one must forget them all—"

"One could grow in them without remembering."

"One could grow much better with the aid of memory, don't you think?"

"I have heard of a law of conservation of matter. There might be a law of conservation of souls."

"There might be almost anything. One does not multiply hypotheses without reason. Have you any evidence for reincarnation?"

"Many civilizations have believed in it."

"I know. By the way, what is your religion? Egyptian? Buddhist?"

"Of course not," cried Stella indignantly. "Do you think I pray to cows and cats and beetles?"

"Have you ever lived as an animal or bird of any sort?"

"That wouldn't have to be."

"It depends on which religion of reincarnation you follow. Why was your uncle so angry with the minister you spoke of?"

"He said it wasn't Christian."

"Well, is it? This belief is contrary to the whole Judeo-Christian revelation and to most of our philosophy. Plato believed in a form of it, and I believe Origen taught some such doctrine. If you want to take it seriously you should study the teachings in its various forms and find out which is to be accepted and why. I've always followed that hard-headed old realist Aristotle, myself. I must admit I have never considered metempsychosis seriously. I believe it can be disproved by philosophical and psychological methods. Do you think you can prove it to be true?"

"I don't want to have an imaginary idea of myself or the world," protested Stella. "I'd much rather have a sound and true one, as you and Tim and the others think you have. Until I came here I thought religion was just something you took on faith without any evidence or philosophical reasoning. But . . . but—"

"Let us try to build up a philosophy that you can depend on," suggested the psychiatrist. "One you can test and prove. I'll give you books to study, and you argue against them all you can." He selected a volume from the shelf. "A practical man, Aristotle; let's start with him. How is your Greek?"

"Oh, this is in both languages," cried Stella in delight.

"I believe Aquinas has some relevant material in 'Contra Gentiles,'" said Peter. "Stella, your knowledge of Egypt is really remarkable, and your books are extraordinarily interesting."

"They must reveal a great deal about me," said Stella. "Tim said you could analyze stories and poems as you do dreams. Could we do that?"

"Certainly, if you would like to," said Dr. Welles. "But don't let it discourage you from writing more about these things of which you have so much knowledge, which you have studied so thoroughly."

"If I have a sound philosophy I can write more wisely as well as live more wisely," said Stella gravely. "Thank you, Dr. Welles. I'll try to find out what can be proved."

Peter relaxed completely when she had left, and sighed in relief. One problem was off his mind. He knew what had been in the little girl's mind, and she had agreed to study under his direction. It would take months, perhaps years, to weigh both sides of the questions she had raised, but it would be good for all the children. Now there remained—

"I've got it!"

Peter jumped to his feet and dialed a number. "I want a plane reservation," he said, "at once if possible." How slow he had been to see the obvious!

"Jay? This is Peter Welles. I'm here in town. I've come to talk to

your guardians, but I want your permission."

"But—what do you want to say?"

"I want to tell them about you," said the psychiatrist. "You can't keep the secret much longer; the school will unavoidably get publicity, and they have the right to know directly from us, before that happens."

"I thought of all that. But you must promise—" he hesitated.

"They may overhear what you are saying?" guessed Peter. "Do you want me to promise I won't ask them to send you to the school?"

"Yes, that's it."

"I give you my word. I won't even mention the possibility."

"Then come."

The doctor was there within half an hour, and the formalities of his introduction were soon completed.

"I represent," said Dr. Welles, "a school for superior children which is being started on the West Coast."

"We could not think of sending Jay away," said Mrs. Curtis.

"I was not going to ask you to do so," said Dr. Welles. "I have another request to make. I have come to ask you to help us there in teaching the children."

"You must be aware that I have lost my sight," replied Mr. Curtis, "and have done no teaching for many years. I retired from that profession in order to devote full time to writing historical works, some years before my sight failed."

"I realize that, sir. But hear me out. The children I am gathering for the school are of extraordinary

brilliance. Although scarcely in their teens, they have written many books and earned fame as inventors and the like, under aliases. I can prove every word I say. What we require of our teachers is a sympathy with the gifted child, and a wealth of knowledge and wisdom to share with the children. They are eager to learn; you would merely be expected to talk with them for an hour or two a day. Let me ask you, are you familiar with the name of James Vernon Worth?"

"Why, yes. His books have been read to me by my wife. But he is not a child, surely?"

"He is your son Jay."

And then Peter told them the whole story. Their incredulity was soon overcome, the situation made clear, and evidence presented—chief of all the evidence of Jay himself.

"But, you rascal," protested his guardian, "when I read the first book which you say is yours, I dictated a letter to you to be sent to the author!"

"Yes, uncle," said Jay, "and it made me mighty proud, too."

"I'm not sure whether I ought to be proud of you, or whether you played me a shabby trick," said Mr. Curtis.

"You ought to be very proud," said Peter Welles. "It was not an unwillingness to confide in you, or that he meant to deprive you of the pleasure of knowing what he had done. These children do not wish or need adult assistance, any more than any adult author—if as much.

We must never betray their pen names. Their achievements must be kept in hiding, under aliases. But they do need to learn history as you can teach it, and I have come here daring to hope that you will do for these other youngsters what you have done for Jay."

"I made him promise he wouldn't ask you to let me go," said Jay. "But please, if you do go, may I go with you?"

"The whole thing is immensely appealing," said Mr. Curtis, "but I hardly like to consider trying to teach again—"

"Of course you'll do it, John," said his wife firmly. "You can write books as well there as here. We haven't taken root in this town forever, have we? And Jay must be with those other youngsters, but he

won't go without us. Salary doesn't matter—there needn't be any. I'll teach languages, too, if you like; I'm a good linguist. We want to have a big share in this wonderful thing, don't we, John?"

"Yes, we do," said Mr. Curtis. "And thank you very much for the invitation, Dr. Welles."

So that, thought Peter as the plane sped him homeward, was that. The expense of the special trip was well repaid. He had Jay, and he had two fine teachers besides. He could start out the next month to interview more prospects, without any nagging worries about either Jay or Stella. More problems would arise, but they could be solved in their turn. Everything was under control. Peter could relax. He slept.

THE END

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## IN TIMES TO COME

Starting next month is a new three-part novel, "The Wizard of Linn," by A. E. van Vogt. A van Vogt novel is always something worth waiting for—and the subject of this one is the final, key explanation of the strange, contrasting world of the Gods series, the world of semibarbarians using spaceships and atomic energy by rule of thumb, of a mighty, ancient civilization smashed. Smashed . . . how?

And the cause of that smashing is the story of the Wizard of Linn.

There's also a novelette by Jim Blish about the ultimate in hobos. A hobo, you remember, is a migratory worker—the journeyman specialist. The hobos of Blish's yarn "Okie" travel through the galaxy, though—a whole city of them, doing the odd-jobs of a hundred planets. But not without certain discomforts, stemming from the politics of an ununified, unco-operative, and generally shoot-first-ask-later attitude of the planets.

And there'll be more shorts than usual, I think.

THE EDITOR



# REGULATIONS PROVIDE

BY RAYMOND F. JONES

*Regulations mean red tape—and red tape can strangle someone as handily as a hangman's rope. Particularly when the someone is an alien desperately in need of a spaceship repair job . . .*

Illustrated by Orban

There is nothing that a government can do that a private citizen can't do better—except make war and spend money.

That had been the philosophy and firm conviction of Joe, senior, now dead and gone these thirty years. Young Joe Williams was himself pushing sixty, but he had never

found occasion to take issue with his father's belief. Rather, with the march of years, he had become more thoroughly convinced of it than ever.

He leaned forward across his desk a moment to look from the window of his second-story office to the vast landing field in front of the building. He confirmed his first glance. The

figure he had seen was that of Inspector O'Connors, red tape artist deluxe.

What went wrong with a man's genes, Joe wondered, to make a bureaucrat out of him? A deep inner necessity for dependence on the power of the group? Whatever it was made it impossible for the red tape artists to stand on their own feet, think their own thoughts, and come to their own conclusions. They were afraid to spit without the authority of public law which they could call to mind by paragraph and line.

And Melvin O'Connors was a thoroughbred of his kind, Joe thought sourly. As long as the company had to endure an Inspection Office upon the premises, why did the chief inspector have to be Melvin O'Connors?

His secretary buzzed a moment later and the inspector came in. You could spot one of them a block away, thought Joe. There was something about the cut of their clothes, the shine of their shoes, their air of "You can't push John Law around, Bud."

"They still up there?" asked O'Connors.

"Well, where would they go?" growled Joe. "They'll circle Earth in that orbit until the next ice age at the rate you're unwinding the red tape. For the sake of a comma in some regulation you'd let people in distress hang on a sky hook for"—he glanced at the clock—"eighteen hours since they first asked to come

in—while you fumble around to determine whether their ancestral stock is pure enough to allow them to set foot on our sacred terra firma. It hasn't been six months since nine of them died because of your precious regulations. If I were on the Intergalactic Advisory Mission, I'd tell everybody to steer so clear of Sol that you'd feel like we were in solitary confinement."

"But, fortunately—for your business—you're not." The inspector glanced out at the field lined with tremendous machine shops, laboratories, and hotels—and the more than a hundred intergalactic ships in various stages of repair and disrepair.

"Fortunately, I'm not. The cross I bear is Emergency Inspection. Do they land or don't they? How long are you going to let those people—?"

"Stop calling them people. They probably have six heads and forty-eight tentacles, and eat their young for breakfast."

"Anybody that has brain enough to transport themselves a hundred thousand light-years across space is people in my book," said Joe. He picked up a thick cigar and chomped heavily on it. "And they're in trouble. Do they land or don't they?"

"We're proceeding according to I. G. Board agreement," said O'Connors. "Regulations provide—"

"That even if a guy is about dead he can go ahead and die as long as he hasn't got a letter of introduction from I. G."

"Regulations provide," continued the inspector patiently, "that in case



of first contact between a visiting race and a given planet, the representatives arriving shall present adequate data for identification which shall then be verified through the I. G. Central Operations unit. That is what we are doing."

"Even if it kills the strangers."

"No exceptions were provided or could be provided for emergency cases. You know that very well. You cannot have forgotten the Trojan incident of Malabar Seven. And so we are proceeding according to regulations and agreement. Any of us would get the same treatment from their planet, wherever that might be."

"You mean you haven't even got them pegged, yet? I told you yesterday they were from Nerane IV and I pointed it out on the charts and showed your central operators the encyclopedic data—"

O'Connors waved disparagingly. "Your sorter isn't official. It has to be verified by our official machines."

"'Sfunny," said Joe, "that after all these hundreds of years the word 'official' is still synonymous with inefficiency and general chowder-headedness. My sorter gets the data in fifteen minutes—yours hasn't got it in more than eighteen hours."

"Official sources require accuracy. We could not afford to be wrong if the landing of this ship involves violation of the I. G. B. regulations, or if these creatures cannot be identified. Your sorter is not concerned with such factors, understandably. You are concerned only with repair-

ing the vessel and making a profit on the operation."

"And what a wicked thing that is! Eh?" said Joe. "We've been over this before. I know when I'm licked, but when will that obsolete monstrosity get its official bowels in gear and give out with the data? I've had a crew standing by since yesterday."

O'Connors didn't answer. He looked speculatively around the plush, luxurious office that was Joe's one vice and his only indulgence. He looked out at the vast properties that represented as much as a small nation might have once possessed. The great shops and laboratories rivaled a government facility.

"We'll be taking you over one of these days," said the inspector. "A government can't tolerate a private enterprise of this scope. This should belong to the people."

"Like the Tyrannosaurus," muttered Joe in a cloud of smoke. "*He* must have kicked and jumped and squealed to the last, too. And you've got just about as much chance now as he had. As long as there is space, you bureaucrats will never be on top again. It took a civil world war to get your kind off the top of the heap once, and you're off for good. In an expanding economy civilization simply passes by while you fuss and holler. It's only in a shrinking world that people think they need bureaucrats and socialists to tell them what to do."

O'Connors shook his head sadly. "The government *needs* men like you. It's tragic that the organizing

and technical ability you possess should be coupled with such atavism."

He turned to the door. "I'll send you an official clearance to bring them in as soon as—and if—the sorter verifies the data given by the disabled craft, and central confirms it."

He left.

Every time, Joe thought. Every time it was like this. Sometimes sooner, sometimes longer. He went to the window and looked out upon the hundred or so craft from every part of the universe that lay on the landing field. That they represented genius incredibly far removed from his comprehension troubled O'Connors not at all. One of them, a huge vessel a mile and a half long and fifteen hundred feet in diameter had come almost three million light-years out of space, the farthest communication that men of Earth had yet had with other sentient beings.

But O'Connors was not impressed. He'd kept them in an orbit above Earth's barrier screen for three days while he checked their credentials.

If there had turned up the slightest inconsistency in the communication between their alien minds and his primitive Earth mentality, he'd have refused entry to their crippled and nearly helpless vessel. He would probably have let them die in space rather than let them down, Joe thought bitterly. The bureaucratic mind!

He stepped back to the desk and called his repair superintendent.

"Winfield, have you heard anything new from the Nerane IV?"

"Not for the last five hours. They might be dead by now if they're in any serious personnel trouble aboard."

"Yeah, they might be, mightn't they? Just like six months ago when he held the Cordomarians off until nine of them died. Nine specimens of the most brilliant intellect we've ever known—sacrificed to a regulation. We're bringing them down. It's not going to happen again."

"But O'Connors—!"

"They have an ellipsoidal hull. He couldn't tell them from a Croesan Nightwing or a Hammerlane."

"As soon as we key the screen to drop it through, some bright lad in central will pick up the data. They're watching us too closely."

"We'll take that chance. People's lives are more important than O'Connors' regulations. Better send out a boarding party if you haven't heard for that long. See if anyone can get into them. Let me know what their trouble is."

"O.K. I'll send out Perkins and his crew."

Joe moved away and stood by the window again. This out there was his, he thought savagely, and no bureaucrat was going to regulate him into murdering his customers. He'd built up this business from the modest scratch his father had started, and it was his to use. He only wished he had someone to pass it on to.

There was Richard, of course, but Richard had disappeared fifteen hundred light-years away twelve years ago. It would be a vain hope to suppose that Richard would ever inherit "Joe's Service and Repair".

In the early days of intergalactic flight, when the super-gee ships were first brought out, a vessel was little more than a flying machine shop and laboratory. It had to be equipped with facilities for virtually rebuilding itself in case of failure or disaster.

That robbed the ships, especially the early small ones, of much of their useful load. Finally, when men made contact with other intelligent life they found it was almost the same among every other group.

For some reason, ninety percent of other inhabited worlds were almost diametrically across the galaxy. When the first meager flights probed earthward, in response to man's explorations, old Joe Williams had been just a boy. He'd walked through the alien hulls in ecstatic rapture. He was only fifteen when he saw the first crippled ship whose occupants had managed to land it on alien earth at the end of its last flight.

They were technicians and navigators, but not engineers. They could not duplicate or repair the worn and shattered power plant of their ship. For five years they lived as prisoners aboard their ship until they were able to get transportation back.

That incident gave him the clue to what he wanted to do with the rest

of his life. This was only the start of a new frontier of technology. There would be increasing hoardes of visitors from other worlds, now that they were aware that an inhabited planet in this region had been located. There would be a place for Earthmen who could repair those alien vessels when the need came.

There were others who had the same idea. But Old Joe had got the jump on them. He saw that mere skill in terrestrial technology would not be enough. After he graduated from the best schools on Earth, he spent five years hopping from one planetary system to another studying where he could, picking up clues and scraps of information about other world technologies, how their spaceships were powered and run, the biology of their occupants, the needs that he might be able to supply on Earth.

It wasn't easy. The worlds across the galaxy were just beginning to set up the First Galactic Council. There were suspicions and doubts, and uneasy meetings. But he obtained enough.

Returning to Earth, he bought twenty-five square miles of American desert and set up business in a veritable shack. For three years he had no customers.

Then he dickered with the government for that impounded vessel which had been abandoned when he was a boy. It was decided that, since the original owners had not come for it by now that a precedent might

well be established by selling it to Joe for a big chunk of his few remaining bucks.

And he rebuilt it. It was a pip, in view of his knowledge and experience he'd gained from his travels. He'd run across an almost identical drive among the Irdians. But he was too broke to do more than take it on a single test run to Mars and back.

That was enough. Somehow the news got around the galaxy faster than the ship itself could have done.

Joe was made.

That was the beginning. The infant FGA sponsored a program of approved service and repair stations at strategic points throughout the galaxy and Joe was automatically for it because by then he knew more than any other Earthman about foreign ships and drives.

It had been a reputation for Young Joe to maintain—and he'd maintained it. If only there were someone to turn it over to—

As usual, the politicians came pounding hard on the heels of the scientists, bent on regulating their betters. Some worlds were more prone to this tendency than others, but Earth was right up front in this respect. There had been a few unfortunate incidents in the meeting of alien cultures—but far fewer than even the most hopeful had supposed. An almost universal fact was that by the time a race had reached the stars it had begun to mature.

Joe turned back to the desk on

which lay the data on the strangers from Nerane IV. Their planet was one of the most nonterrestrial so far encountered. Little commerce passed between its peoples and the rest of the galaxy, yet their ships occasionally called on exploratory or cultural missions, though none had been to Earth before.

The creatures had a hard exoskeleton. Stiff, bony appendages supported them on a planet eight times the mass of Earth. They lived in a yellow-brown fog of nitrogen peroxide at a pressure of about one sixth Earth atmosphere.

In an almost symbiotic relationship they lived with another species, a small, remotely monkeylike creature called *mensa*. These were controlled by telepathic forces and performed the physical work which the clumsy exoskeletons of the more intelligent creatures did not permit.

Joe read through the data from the massive library his company had accumulated on a hundred thousand planets and cultures. He did not have the slightest conception of what kind of metabolism an atmosphere of nitrogen peroxide could support—or even if it were necessary to the creatures' metabolism. But, at any rate, it was reported that their ships were provided with such an atmosphere.

Winfield called as he finished the file.

"Perkins is in contact with them," he said. "They were just about to give up and go away. He didn't think it necessary to go aboard since they

seemed to be doing all right for the time being. One of them is very sick, they said. That's one reason why they're in such a steam to get the ship repaired."

"All right. We still have no official clearance on them. Get them down. Use one of the pressure hangars, just in case. We wouldn't want to smash them with our atmospheric pressure in case of accident. And I'd hate to have theirs get loose on the field."

"Think we ought to have quarters for the crew?"

"Do you know how many there are?"

"Just two, they say."

"Two? On a ship that size?" Joe recalled the photographs and plans of Neranian ships. "I'd say there ought to be a hundred of them at least. Something funny if only two are aboard. Anyway, we'd better get quarters ready. It might be necessary to evacuate the ship to work on it."

It was about a half hour later that the dark oval of the ship appeared over the field. The service ship in which Perkins and his crew rode followed at a little distance, talking the strangers down.

It wasn't without reason that Old Joe had picked a desert site for his operations. Some of the visitors were sloppy pilots near a planet, and at other times ships came in almost completely out of control, crashing all over the landscape in a futile attempt to set down normally.

But the Nerane ship was adequately controlled. Joe wouldn't have called it a first-class landing, but it was good enough. He saw Perkins land a short distance away. Within minutes the ship was being towed towards the large, pressurized hangar where no damage would be done if the obnoxious atmosphere within the ship were to get free.

Joe turned away. He would have liked to have gone out and handled the job himself, but there were too many other matters at hand. Too many executive matters. Joe gagged on that word. It made him think of plump, jolly men at luncheon clubs.

It was six-thirty, and the evening crews had come on, when he folded up his papers and decided to call it a day. Many of the customers insisted on continuous attention to their needs, so Joe had long ago gone on a round-the-clock basis. He wondered how they were coming on the Nerane ship.

Even as he thought about it, his phone buzzed and Litchfield, Chief Repair Engineer, spoke:

"Joe? This Nerane IV ship is a screwball setup. We can't find anything wrong with the thing. It's a heavy-water outfit with a type eight drive and a few modifications. As far as we can see it's in perfect working order. The Neranians say it goes all right up to about half cee, but the super-cee won't throw in. We've checked it with the Manson field, and it works perfectly as far as we can see. I don't think these soap-brains know how to run the ship."

"Were there only two of them aboard as Perkins said?"

"That's right."

"How about their *mensa*? That's the little monkeys that they use to do the heavy work. Telepathic symbiosis."

"Didn't see anything of them. Just these two crabshells."

"Well—it's none of our business if things aren't according to Hoyle with the customers. You're sure they're Neranians?"

"I'm not sure of anything. They look like the pictures in our library books."

"I was thinking maybe they had bought the ship from the Neranians and perhaps had not been instructed properly."

"But look—how could they get clear out here, if the super-cee had *never* been working. That's about ninety thousand light-years, isn't it?"

"Something like that. Maybe something's conked out that the Manson field doesn't show. There could be a first time. Take the ship up on a run and see what the trouble is. That's about the only way."

"Yeah, but I'd like to get away from that, unless we could dump the gas. If we don't, it means wearing the barrel bottoms, and it's no fun riding in those in a ship that's bucking its super-cee."

"Think of something else then—Oh, let's take it up. I'll go with you. Get things ready. I'll be down in a minute. While you're waiting, try a cerebral analogue on them."

"We tried to. They refused to

have anything to do with it. Wouldn't let their brains be tinkered with. A coverup, I suspect, to keep us from finding out how small a quantity of the stuff they've got."

"Maybe I can talk them into it. Hang on."

It wouldn't have been so bad if the business involved merely straight mechanical repair. They could have repaired hulls, replaced reactor piles, counteracted wild radioactivity, rebuilt drives, or anything else in the mechanical or nuclear line, but in nearly every job they had to deal with—usually contend with—the personality and alien thinking of the crew. It was tough enough trying to figure out how to repair a drive manufactured two million light-years away on a planet that no Earthman had yet seen by creatures whose thoughts were only remotely like those of men—but when members of the species, who were ignorant of the principles of their own machines, tried to tell Joe's men how to fix things, then it got complicated.

That's why the biological and psychological departments of his company were nearly as big as the mechanical.

He went to the lock in front of the closed hangar and donned one of the coated steel, articulated joint suits which would enable him to enter the atmosphere of the ship. These were the uncomfortable outfits known as "barrel bottoms" in which it was sometimes necessary to work inside the foreign vessels. They would stand anything from a vacuum to a

hundred atmospheres pressure, and were completely noncorrosive in any liquid or gas that anyone had thought about to date.

There was no opening for vision. The helmets were faceless steel blanks. Sight was by viewscreen entirely—a small plate set in front of the wearer's face.

Joe stepped inside the hangar before he remembered to turn his plate on, and stumbled around in blindness.

"Where are you going—?" He heard Litchfield's voice.

"Haven't worn one of these for so long—" he mumbled while his fingers sought the controls. "There—"

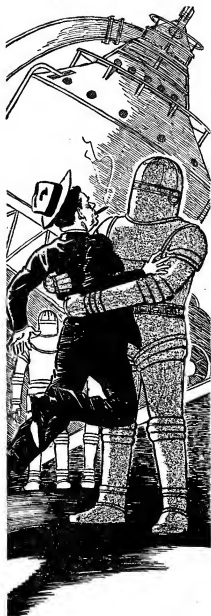
The interior of the hangar showed on his plate. Floodlights poured illumination over the polished hull. Beautiful, seamless construction, Joe noted.

"Where's your cerebropath? Inside?"

"No. We found some terminals in the ships lock so we ran some leads and put our end outside. It's over here."

In spite of the paramagnetic assistance, Joe waddled awkwardly in the heavy suit. On the other side of the ship he came to a panel of apparatus with a cable of leads running into the open lock door of the ship. On a screen, he saw the interior. The two Neganians were looking at him through a thick yellowish brown haze that was the atmosphere in which they lived.

He had long been accustomed to



appearances of foreign creatures, which were repulsive by Earth standards, but these two specimens were among the most unbeautiful he had ever seen.

He stepped up to the instrument and spoke to them, the machine automatically making a semantic transfer of his language meanings into theirs. "I am Joe Williams," he said. "You have heard of me, of course, since you have come here for repairs."

"Your name is well known throughout this and many other galaxies," said one of them. He couldn't tell which. The voice that spoke was not theirs, of course, but only the electromechanical reproducer of the instrument.

"We felt sure that you could repair our ship," continued the Neranian. "We have far to go, and one of us is sick. We cannot make use of our super-cee drive. We have been disappointed by the report of your technicians that they can find nothing wrong with the mechanism."

"Our tests show the super-cee to be operating," said Joe. "We thought perhaps it would be best to take the ship out for a trial run. You might be able to demonstrate the trouble better that way, however, we could possibly save time if you would allow a cerebral analogue check."

"This means mind reading—?"

"Well . . . not exactly—"

"I fear we cannot submit. We do not understand your meaning. The test is unfamiliar to us. You will, naturally, excuse our suspicions."

"Of course. But the test is based

on a simple premise. In every race it has been found that the artifacts of the culture have analogous structures in the brain cells of the species. Very frequently, when we find a complex piece of equipment which we cannot analyze, we can discover its means of operation by means of analogues derived from the fundamental structure of the brain of the creating species."

The two Neranians were silent, as if conferring with each other for a moment. Then the voice came again. "We cannot permit it. We would prefer that you make a check flight."

Joe shrugged inside his suit. "As you wish."

The cerebropath was moved inside the ship. Joe and Litchfield went aboard with two young technicians named Barnes and Hamilton.

In the murky atmosphere of the ship, Joe was sure his suit was leaking. He would have sworn he could smell the foul stuff the Neranians lived in.

Must be getting old, he thought. He remembered when he was a kid and his father had taken him through the first ships from out of the distant galaxies. He remembered the kind, ugly faces of those first visitors he'd met. But it was just as well that that kind of thrill didn't last forever, he supposed. Nobody could live all his life on the high emotional plane he enjoyed when he was a kid.

The ship glided out of the open doors of the hangar under the guidance of the ground crew. It was towed far out beyond the shops to



the desert testing-stand field.

Joe watched the Neranians' handling of the ship with a critical eye. "I thought you people always used your *mensa*," he said abruptly.

The two at the control panel seemed to stiffen, he thought afterwards. They hesitated, then one spoke. "We are trying to get away from them. It is cumbersome to depend on them. We have been trying a surgical technique to enable us to do without them."

Joe grunted. It didn't look as if they had been very successful. They were clumsy in their manipulation of the controls.

"Head out at right angles to the plane of the ecliptic," he ordered. To his companions, he said, "You three go down and watch the engines. When the sub-ces get up to limit, I'll come back there and try to throw in the manuals on the super-cee."

The three men ducked awkwardly through the low corridors. The ship was designed with paragravity controls for horizontal walking instead of vertical climbing.

Fortunately, the Neranians were no more than a foot shorter than the Earthmen. Occasionally, there were ships in which it was impossible for a man to get about through the small openings that fitted the builders.

As the ship sped swiftly upward, Joe watched the indicators. As far as he could see, everything was functioning well.

"All right," he said to the Neranians. "I'll go back and try the super-cee from the engine room. If

it works all right, you cut it out after a couple of minutes, and we'll work on it from up here. You have to cut it off, remember. Once it's on, we can't get into it from down there because of the field buildup."

The creatures gave the Neranian equivalent of a nod. Joe ducked and clumped his way through the low, narrow passages to the far rear of the ship.

"There is nothing wrong with this ship," said Litchfield. "We've gone over every item of the super-cee."

"Well, we'll soon know. Get behind the shield." Joe stepped up to the intricate panel. The manipulations were extremely involved and required great exactness to keep the ship from vanishing in very small particles of stardust when the faster-than-light drive came on. Finally, it was done, and he squeezed a pair of handles, the Neranian equivalent of a relay push button. Instantly, a copper haze surrounded the mass of equipment beyond the panels, and the meter needles swung over.

"See?" said Litchfield. "Nothing wrong with it."

Joe watched the panels in silence. The engineer was right. There was no question about it. But why had the Neranians come to him with a perfectly good ship and asked for repairs?

"Let's go back and have a talk with our friends," he said. There's just the bare possibility that there's trouble in the relays and these birds didn't have sense enough to try the

engine room manuals before yelling for help."

The four of them left the engine room, swinging the automatic bulkhead door behind them. The next chamber through which they passed was a mechanical storage room.

Joe pushed on and shoved against the next bulkhead door. He shoved again, then leaned on it hard and swore. "What goes on?"

Suddenly, Litchfield went to the barrier behind them and pushed. It was locked. The engineer matched Joe's swearing and looked at his boss.

"Locked—the mechanicals controlled from up front. Does it make sense?"

Joe expelled air slowly through his teeth. "It begins to," he said. "It begins to."

"I don't get it," said young Barnes, the technician. Fear edged his voice.

"This ship is hot," said Joe. "That's our answer."

"Hot?" said Hamilton. "You mean radioactive? We checked—"

"No. It's a vulgar term common in my Dad's day. There was some of it then, but almost none now. It means that those two clamshells up front just took off with the ship without asking anybody's permission. In plain language, they stole it."

"I don't follow you," said Litchfield.

"They aren't Neranians at all. They must be very closely related, but they're not the same species. We should have known that by the ab-

sence of the *mensa*. That story about surgical modification is a lot of guff.

"This ship is designed for operation by *mensa*. There are handles and buttons and wheels, but nothing to fit the claws of that pair up front."

"Well, it still doesn't make sense. Why did they come to us? Why all the talk about failure of the super-cee? Most of all, where do we go from here?"

"I suspect they're probably a pair of pretty desperate criminals. Thugs are thugs in any language—and generally not very bright. Setting the automatic controls of the super-cee requires fine digital manipulation. They simply couldn't do it. They've come on sub-cee from wherever they swiped the ship. They didn't even know about the engine manuals, I suppose, or else they couldn't even set them. They hoped to get us to start the thing on automatics, and then planned to get rid of us somehow. It might have been a little tough unless they have weapons that would go through these suits easily. But we made it perfectly simple for them, bless our little hearts. We offered to walk right into their trap.

"As to where we go from here—I don't think they're worrying much about it. But we'd better. Probably the only atoms of free oxygen aboard are in these tanks of ours. Mine says"—he scanned the indicators beside the viewplate in front of his face—"about six hours to go."

"I've got eight," said Litchfield. "Maybe we could even it up some way."

"Mine's seven," said Hamilton, "and we can't even it up. There's no provision for decoupling the tanks in an atmosphere like this. Which is a neat piece of design."

"I've got four here," said Barnes. His voice was on the verge of cracking, it seemed to Joe. "I'll be seeing you, boys."

"Cut it out," said Joe uneasily. "We'll get out of here and have clam chowder for desert. Though I must admit the 'how' of doing so eludes me at the moment. Four hours—and they've souped this up to about eight cee, I'd judge—we'll be a long way from home."

They moved slowly about the room. There were two other chambers open to them, one on either side, but there was no exit. They decided that one contained the machinery for producing and circulating the foul nitrogen peroxide atmosphere. The other was a storage chamber for the heavy water used in the reactor.

There was a small store of tools, but none that would dent or burn the doors. Barnes and Hamilton had brought along their kits, but they held nothing that would help.

They sat down on rows of canisters. Joe looked about at the blank-faced, monstrous-looking suits that housed his companions. They were silent, thinking that this was a stupid way of winding up. There was Barnes with only four hours of oxygen to go. They couldn't share theirs with him.

"Why couldn't we wreck the at-

mosphere plant?" asked Barnes suddenly. "Maybe we could even find a way to discharge it into space. That would fix those clamshells' little red wagon good."

"Yes, but what good would it do us?" said Joe. "We'd still be locked in here and no way out."

"We'd be taking them with us, anyway—" Barnes muttered savagely.

"Cut it out," said Joe. "This is entirely impersonal. Get your gray matter agitating on the physical problem of getting out. You can hate them afterwards. Now, as I see it, the problem is to persuade them to open up the door voluntarily. We can't possibly get out unless they do."

"You put it so neatly," said Hamilton. "What are we going to do? Offer a free ride to the one that opens up first?"

They were young, Joe thought, and they'd never been trained for danger. Life was too soft for kids nowadays. It was probably the first time these two youngsters had ever considered the possibility of fatal circumstances occurring to them.

They wouldn't be of much help.

He turned to Litchfield. "What do you think?"

"I'm thinking, but there's not much production so far. I don't see what we can do to make them turn us loose."

"Irritate 'em."

"Like itching powder under their shells, huh?"

"Maybe there's something here

that we could pour into the atmosphere system. Let's have a look anyway. Tear open some of these cans."

He glanced at the clock face in the helmet. A full half hour had passed since the doors had first been clamped. Three and a half to go—for Barnes.

Litchfield held up an open can. He had a steel claw full of mushy substance. "Must be food. Do you know what they eat?"

"No. Keep going and keep thinking."

The two technicians were halfheartedly obeying Joe's instructions, but they had no enthusiasm for the task. They'd given up completely, he thought. He and Litchfield would have to carry them.

He kept on, opening boxes and storage cabinets, trying to identify the substances encountered, his mind constantly examining and rejecting each item for possible means of attracting the captors to the locked chamber.

He wandered on into the chamber where the huge tanks of heavy water were stored.

"We haven't found a supply of drinking water, have we?" said Joe.

"All food as far as I can tell here," said Litchfield.

"On a planet with an atmosphere of nitrogen peroxide I wonder if there wouldn't be an absence of open bodies of water. Perhaps the metabolism of any life there would have to exist without water."

"I don't know," said Litchfield. "Why? Well—I suppose not. Con-

stant reaction would produce nitric acid rain. In time there would be no more water because the process would go to termination. On a planet like that they'd probably handle water the way we do nitroglycerine. So—" Litchfield suddenly shouted. "Joe! That's it! We'll irritate these crabs until they'll swear they're being broiled alive."

"I don't get it," said Hamilton. "What are you going to do?"

"Pipe some of this water over to the atmosphere pumps. Those crabs will be breathing nitric acid vapor—providing they breathe. If they don't, I'll bet it will sting their hides and send them back here yammering to get in."

"Yeah . . . yeah . . . it might do it," breathed Barnes. His voice was almost pitiful at this apparent reprieve.

"Well, let's not bank on it until it's done," Joe growled. "This won't be easy with what we've got to work with."

"Turn about will have to be within an hour—" Barnes murmured.

They found a coil of tubing among the supplies. It was soft enough to bend, but it couldn't be melted or soldered with the small torch that their kits contained. They had to improvise a coupling to the tank outlet. The tubing was too soft to permit tight clamp. Its size would only permit a butt joint.

The makeshift flange coupling that they finally devised cost them a full half hour. And they still had to

provide an inlet to the gas system.

While Barnes and Hamilton cut into the tough metal of the ducts just ahead of the blowers, Joe and Litchfield made some nozzles and fitted them crudely to the end of the line. The height of the tank provided some standpipe pressure, and the blower made a partial vacuum in the duct so they believed the water would be broken up sufficiently.

They inserted the nozzles and turned the water on. It sprayed out with satisfying sharpness. They packed the hole tightly to improve the spray. Then they sat back to wait.

"How long do you think it will take?" asked Barnes hopefully.

"No telling," said Joe. "It will take a while to build up sufficient concentration of acid for them to notice. We're a long way from the control room—"

Nobody said anything. An hour and a half left. Past turn-about time for Barnes. They were going to have to watch him die, Joe thought. But they wouldn't see him. Hidden behind the blank steel face of the helmet, his face wouldn't be seen by anyone. It would be like dying all alone.

"You lie down," he said abruptly. "Breathe as slowly as possible. Close your eyes and stop stewing. The rest of us will get busy and rig up some kind of an electrolysis setup so that the moment we get out of here, we'll blow out one of these water tanks and rig up the other one to collect some oxygen. We can get in there

and equalize our suit supplies and replenish them. Maybe a couple of us can hole up in the tank and let the others run the ship back home by using the supply of the four suits. Take it easy, Barnes. We're all going to get out of this."

He didn't believe that any more, he thought, but it helped to say it. The water line had cost them too much time. Turn-about was too far gone, even with such added velocity as they might obtain during return. Litchfield could go another hour and a half. He might make it alone.

The work kept their minds from degenerating into circularity of thought. They had to exercise their brains to rip out the right power lines while they were hot, and feed them to the terminals they had rigged up. With a collector for the oxygen and hydrogen, they were all ready to be inserted in a tank as soon as the gas could be blown free by opening the chambers to space.

And then they had done all that they could do. There was nothing at all to do but wait. They lay on the floor to conserve their oxygen. Joe kept thinking maybe there was something they had overlooked—something utterly simple that would enable them to move right out of the chamber.

Barnes had been quiet for a long time. Joe wanted to talk to the boy, but he couldn't think of anything to say. It was no good telling him he wasn't going to die—because it was a thousand to one chance he was.

When there was only fifteen minutes supply left to Barnes, Joe said, "Barnes—?"

Only after a long pause did the technician answer, and then his voice was weak and sleepy sounding. "Yes—?"

"I'm sorry, kid. I thought I was smart breaking the regulations and letting these crabs down. A regulation would have sent them away, and none of us would be here now."

"It's O.K.," said Barnes, and his voice sounded more secure than it had at any time since they had been trapped. "It's not bad this way. I feel just kind of sleepy. I guess they call it anoxia, don't they? Hope you guys make it. Be sure to see Mary. Tell her I wasn't even scared a bit."

And then they heard the scratching at the door. Unbelieving, they listened, and heard it again. The three of them scrambled to their feet as swiftly as possible in the clumsy armor. They hid behind the door, and waited for it to open a crack.

Joe got his steel fingers into it and jerked. The creature on the other side stumbled and fell into the room, thrashing weakly on the floor. His skin, visible between the joints of the exoskeleton was livid with acid burn, and his eyes were nearly shut.

"Take care of Barnes," Joe ordered the other two. "I'll go up front and turn us around."

"The other one might be armed—" Litchfield warned.

"It won't matter if he's in as bad condition as this one. Block this door and come up in three minutes if we don't turn."

Joe had little fear of opposition after seeing what the acid had done to the one creature, but he kept a sharp watch as he came into the control chamber.

He needn't have. The creature was slumped in the cradle that supported him before the panel of controls. He saw Joe but made no move. The cerebropath was still operating, and he spoke.

"We . . . didn't know what had happened to you. We thought you were . . . taking care of engines. Didn't know you were locked in—"

A liar to the last. Joe smothered a temptation to crash his steel fist into that face. He unfastened the straps and dumped the creature to the floor. Swiftly, he cut out the super-cee drive. The controls worked perfectly, as he had known they would. The creatures had been lying from the first.

He turned the ship around with the reaction motors, checked his position. He thought the ship had moved in a straight line since take-off. He reversed the heading a hundred and eighty degrees: That would put them close. Later, he could correct for small errors. He threw in the super-cee again and locked it.

He started back to the rear of the ship. The creature on the floor stirred, but Joe knew there was no fight left in it. The acid vapor still poured through the ship, and there

was no way to get it out now. They'd have to take it until they got back to Earth.

He returned to the rear of the ship. The two armored figures were still bending over the form of Barnes.

"He died," said Litchfield. "We got the oxygen generator going, but it is too slow building up pressure. He was almost gone the last time he spoke to us."

Red tape, Joe thought. Red tape would have saved young Barnes. If they had been careful enough to check the incoming ships and passengers adequately, Barnes would be alive and home with Mary.

O'Connors was right, he thought dully. You had to be accurate. You couldn't afford a slip. This was what happened when you slipped.

And to be absolutely sure, you had to be a dealer in red tape.

Joe turned away from the dead technician. From now on his place would be known throughout the systems as the house of red tape. He'd make O'Connors' office look like the sloppiest port of entry anywhere. Joe Williams would be the king of red tape.

It was well past sun-up when they brought the ship back over the field. Navigational corrections on the Nerane instruments had taken longer than they had thought.

Barnes' wife was waiting by the administration building in the new yellow car that Barnes had been quite proud of. Waiting to take him home, and Joe would have to

tell her that her husband was never coming home again.

O'Connors was there, too. The three men climbed down from the ship, their suits still on. O'Connors advanced towards them.

"Mr. Williams—?" He laughed faintly at the blank steel faces. "I presume one of you gentlemen is Mr. Williams."

No one said anything. Joe hated him because he had been so right about the regulations.

"There'll be serious consequences from you admitting this ship without clearance," said O'Connors. "Our report from Nerane IV shows that this ship has been stolen. We will have to commandeer such of your facilities as are necessary to impound the ship and the crew. As for your breaking regulations, there may be some amelioration in the fact that you made possible the capture of the ship and the thieves—"

"They're dead," said Joe tonelessly. "One of our boys is dead, too."

O'Connors seemed taken aback. "That's very serious. It greatly complicates matters. Regulations provide for an investigation by the Mission in the case of death of one species aboard the commercial vessel of another."

"I said one of our boys was dead," repeated Joe. "Don't regulations provide for any sympathy or consolation? Don't they allow you any expression of human feeling whatever?"

"Of course," said O'Connors hastily. "The department will ex-

press official condolences to—the next of kin. I'll have to check with central, however, to determine if I'm authorized to speak in the name of the department or if it must come from higher up. You know how rigid organization is."

"Yes—I know," said Joe.

He had been wrong, he thought with fierce satisfaction. Red tape *wasn't* the way. Red tape wasn't synonymous with the precautionary, careful thinking that Joe should have done.

Joe leaned over and picked up a two-inch bar of steel that had been carelessly dropped on the field. In the steel hands of the armor suit he slowly twisted it until it sheared in two. He dropped the pieces on the ground. He advanced on O'Connors. The inspector looked from side to side at Joe's companions uneasily. "What are you *doing*—?"

Joe reached out swiftly and clamped him between the two steel arms. The inspector squealed and wriggled loose. Joe let him drop to the dusty ground.

For a moment, O'Connors looked from one to the other of the faceless men. "You'll pay for this! I'll sue—"

They advanced again. The disheveled man turned and ran in panic across the field.

Yes, he'd pay, Joe thought tiredly. But it was worth it to see that red tape artist scrambling in the dust.

He shuddered when he thought back to that moment when he'd almost believed that O'Connors' way was right.

That young Barnes had died because of carelessness in dealing with the strangers was bitter knowledge. But regulations piled on regulations were not the cure for carelessness.

The red tape promoters added law to law and pretended it was wisdom. They demanded obedience to regulation merely for the sake of regulation, and they had long ceased to think outside the scope of their sacred rules.

But they betrayed themselves when their laws did not cover the situation at hand. There had been the Trojan incident of Malabar Seven. There had been the death of the nine Cordomarians. And there was the death of Barnes.

There was no simple answer. All the laws in creation could not cover all the cases of emergency aboard interstellar ships. Each had to be made a separate case, and sometimes you could make mistakes that way. But not as many as by the blind application of blanket regulations. The fight that Joe had carried on for so long to have the regulations modified would have to go on.

He turned back to the building and changed from the steel armor suit. Then he went across to the girl who was still waiting in the yellow car.

THE END



# THE MERCENARIES

BY H. BEAM PIPER

*Once, wars were won by maneuvering hired fighting men; now wars are different—and the hired experts are different. But the human problems remain!*

Illustrated by Brush

Duncan MacLeod hung up the suit he had taken off, and sealed his shirt, socks and underwear in a laundry envelope bearing his name and identity-number, tossing this into one of the wire baskets provided for the purpose. Then, naked except for the plastic identity disk around his neck, he went over to the desk, turned in his locker key, and passed into the big room beyond.

Four or five young men, probably soldiers on their way to town, were coming through from the other side. Like MacLeod, they wore only the plastic disks they had received in exchange for the metal ones they wore inside the reservation, and they were being searched by attendants who combed through their hair, probed into ears and nostrils, peered into mouths with tiny searchlights, and employed a variety of magnetic and electronic detectors.

To this search MacLeod sub-

mitted wearily. He had become quite a connoisseur of security measures in fifteen years' research and development work for a dozen different nations, but the Tonto Basin Research Establishment of the Philadelphia Project exceeded anything he had seen before. There were gray-haired veterans of the old Manhattan Project here, men who had worked with Fermi at Chicago, or with Oppenheimer at Los Alamos, twenty years before, and they swore in amused exasperation when they thought of how the relatively mild regulations of those days had irked them. And yet, the very existence of the Manhattan Project had been kept a secret from all but those engaged in it, and its purpose from most of them. Today, in 1965, there might have been a few wandering tribesmen in Somaliland or the Kirghiz Steppes who had never heard of the Western Union's Philadelphia

Project, or of the Fourth **Komin-**tern's Red Triumph Five-Year Plan, or of the Islamic Kaliphate's Al-Borak Undertaking, or of the Ibero-American Confederation's Cavor Project, but every literate person in the world knew that the four great power-blocs were racing desperately to launch the first spaceship to reach the Moon and build the Lunar fortress that would insure world supremacy.

He turned in the nonmagnetic identity disk at the desk on the other side of the search room, receiving the metal one he wore inside the reservation, and with it the key to his inside locker. He put on the clothes he had left behind when he had passed out, and filled his pockets with the miscellany of small articles he had not been allowed to carry off the reservation. He knotted the garish necktie affected by the civilian workers and in particular by members of the MacLeod Research Team to advertise their nonmilitary status, lit his pipe, and walked out into the open gallery beyond.

Karen Hilquist was waiting for him there, reclining in one of the metal chairs. She looked cool in the belted white coveralls, with the white turban bound around her yellow hair, and very beautiful, and when he saw her, his heart gave a little bump, like a geiger responding to an ionizing particle. It always did that, although they had been together for twelve years, and married for ten. Then she saw him and smiled, and he came

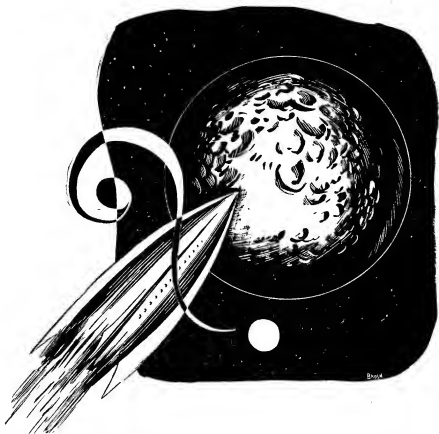
over, fanning himself with his sun helmet, and dropped into a chair beside her.

"Did you call our center for a jeep?" he asked. When she nodded, he continued: "I thought you would, so I didn't bother."

For a while, they sat silent, looking with bored distaste at the swarm of steel-helmeted Army riflemen and tommy-gunners guarding the transfer platforms and the vehicles gate. A string of trucks had been passed under heavy guard into the clearance compound; they were now unloading supplies onto a platform, at the other side of which other trucks were backed waiting to receive the shipment. A hundred feet of bare concrete and fifty armed soldiers separated these from the men and trucks from the outside, preventing contact.

"And still they can't stop leaks," Karen said softly. "And we get blamed for it."

MacLeod nodded and started to say something, when his attention was drawn by a commotion on the driveway. A big Tucker limousine with an O.D. paint job and the single-starred flag of a brigadier general was approaching, hornning impatiently. In the back seat MacLeod could see a heavy-shouldered figure with the face of a bad-tempered great Dane—General Daniel Nayland, the military commander of Tonto Basin. The inside guards jumped to attention and saluted; the barrier shot up as though rocket-propelled, and the car slid through; the barrier slammed



down behind it. On the other side, the guards were hurling themselves into a frenzy of saluting. Karen made a face after the receding car and muttered something in Hindustani. She probably didn't know the literal meaning of what she had called General Nayland, but she understood that it was a term of extreme opprobrium.

Her husband contributed: "His idea of Heaven would be a huge

research establishment, where he'd be a five-star general, and Galileo, Newton, Priestley, Dalton, Maxwell, Planck and Einstein would be tech sergeants."

"And Marie Curie and Lise Meitner would be Wac corporals," Karen added. "He really hates all of us, doesn't he?"

"He hates our Team," MacLeod replied. "In the first place, we're a lot of civilians, who aren't subject to

his regulations and don't have to salute him. We're working under contract with the Western Union, not with the United States Government, and as the United States participates in the Western Union on a treaty basis, our contract has the force of a treaty obligation. It gives us what amounts to extraterritoriality, like Europeans in China during the Nineteenth Century. So we have our own transport, for which he must furnish petrol, and our own armed guard, and we fly our own flag over Team Center, and that gripes him as much as anything else. That and the fact that we're foreigners. So wouldn't he love to make this espionage rap stick on us!"

"And our contract specifically gives the United States the right to take action against us in case we endanger the national security," Karen added. She stuffed her cigarette into the not-too-recently-emptied receiver beside her chair, her blue eyes troubled. "You know, some of us could get shot over this, if we're not careful. Dunc, does it really have to be one of our own people who—?"

"I don't see how it could be anybody else," MacLeod said. "I don't like the idea any more than you do, but there it is."

"Well, what are we going to do? Is there nobody whom we can trust?"

"Among the technicians and guards, yes. I could think of a score who are absolutely loyal. But among the Team itself—the top researchers

—there's nobody I'd take a chance on but Kato Sugihara."

"Can you even be sure of him? I'd hate to think of him as a traitor, but—"

"I have a couple of reasons for eliminating Kato," MacLeod said. "In the first place, outside nucleonic and binding-force physics, there are only three things he's interested in. Jitterbugging, hand-painted neckties, and Southern-style cooking. If he went over to the Komintern, he wouldn't be able to get any of those. Then, he only spends about half his share of the Team's profits, and turns the rest back into the Team Fund. He has a credit of about a hundred thousand dollars, which he'd lose by leaving us. And then, there's another thing. Kato's father was killed on Guadalcanal, in 1942, when he was only five. After that he was brought up in the teachings of Bushido by his grandfather, an old-time samurai. Bushido is open to some criticism, but nobody can show where double-crossing your own gang is good Bushido. And today, Japan is allied with the Western Union, and in any case, he wouldn't help the Komintern. The Japs'll forgive Russia for that Mussolini backstab in 1945 after the Irish start building monuments to Cromwell."

A light-blue jeep, lettered *MacLeod Research Team* in cherry-red, was approaching across the wide concrete apron. MacLeod grinned.

"Here it comes. Fasten your safety belt when you get in; that's Ahmed driving."

Karen looked at her watch. "And it's almost time for dinner. You know, I dread the thought of sitting at the table with the others, and wondering which of them is betraying us."

"Only nine of us, instead of thirteen, and still one is a Judas," MacLeod said. "I suppose there's always a place for Judas, at any table."

The MacLeod Team dined together, apart from their assistants and technicians and students. This was no snobbish attempt at class-distinction; matters of Team policy were often discussed at the big round table, and the more confidential details of their work. People who have only their knowledge and their ideas to sell are wary about bandying either loosely, and the six men and three women who faced each other across the twelve-foot diameter of the teakwood table had no other stock-in-trade.

They were nine people of nine different nationalities, or they were nine people of the common extra-nationality of science. That Duncan MacLeod, their leader, had grown up in the Transvaal and his wife had been born in the Swedish university town of Upsala was typical not only of their own group but of the hundreds of independent research-teams that had sprung up after the Second World War. The scientist-adventurer may have been born of the relentless struggle for scientific armament supremacy among nations and

the competition for improved techniques among industrial corporations during the late 1950s and early '60s, but he had been begotten when two masses of uranium came together at the top of a steel tower in New Mexico in 1945. And, because scientific research is pre-eminently a matter of pooling brains and efforts, the independent scientists had banded together into teams whose leaders acquired power greater than that of any *condottiere* captain of Renaissance Italy.

Duncan MacLeod, sitting outwardly relaxed and merry and secretly watchful and bitterly sad, was such a free-captain of science. One by one, the others had rallied around him, not because he was a greater physicist than they, but because he was a bolder, more clever, less scrupulous adventurer, better able to guide them through the maze of international power-politics and the no less ruthless if less nakedly violent world of Big Industry.

There was his wife, Karen Hilquist, the young metallurgist who, before she was twenty-five, had perfected a new hardening process for SKF and an incredibly tough gun-steel for the Bofors works. In the few minutes since they had returned to Team Center, she had managed to change her coveralls for a skirt and blouse, and do something intriguing with her hair.

And there was Kato Sugihara, looking younger than his twenty-eight years, who had begun to demonstrate the existence of whole

orders of structure below the level of nuclear particles.

There was Suzanne Maillard, her gray hair upswept from a face that had never been beautiful but which was alive with something rarer than mere beauty; she possessed, at the brink of fifty, a charm and smartness that many women half her age might have envied, and she knew more about cosmic rays than any other person living.

And Adam Lowiewski, his black mustache contrasting so oddly with his silver hair, frantically scribbling equations on his doodling-pad, as though his racing fingers could never keep pace with his brain, and explaining them, with obvious condescension, to the boyish-looking Japanese beside him. He was one of the greatest of living mathematicians by anybody's reckoning—the greatest, by his own.

And Sir Neville Lawton, the electronics expert, with thinning red-gray hair and meticulously-clipped mustache, who always gave the impression of being in evening clothes, even when, as now, he was dressed in faded khaki.

And Heym ben-Hillel, the Israeli quantum and wave-mechanics man, his heaping dinner plate an affront to the Laws of Moses, his white hair a fluffy, tangled chaos, laughing at an impassively-delivered joke the English knight had made.

And Rudolf von Heldenfeld, with a thin-lipped killer's mouth and a frozen face that never betrayed its owner's thoughts—he was the spe-

cialist in magnetic currents and electromagnetic fields.

And Farida Khourouglu, the Turkish girl whom MacLeod and Karen had found begging in the streets of Istanbul, ten years ago, and who had grown up following the fortunes of the MacLeod Team on every continent and in a score of nations. It was doubtful if she had ever had a day's formal schooling in her life, but now she was secretary of the Team, with a grasp of physics that would have shamed many a professor. She had grown up a beauty, too, with the large dark eyes and jet-black hair and paper-white skin of her race. She and Kato Sugihara were very much in love.

A good team; the best physics-research team in a power-mad, knowledge-hungry world. MacLeod thought, toying with the stem of his wineglass, of some of their triumphs: The West Australia Atomic Power Plant. The Segovia Plutonium Works, which had got them all titled as Grandees of the restored Spanish Monarchy. The sea-water chemical extraction plant in Puerto Rico, where they had worked for Associated Enterprises, whose president, Blake Hartley, had later become President of the United States. The hard-won victory over a seemingly insoluble problem in the Belgian Congo uranium mines—He thought, too, of the dangers they had faced together, in a world where soldiers must use the weapons of science and scientists must learn the arts of violence. Of the treachery of the Is-

lamic Kaliphate, for whom they had once worked; of the intrigues and plots which had surrounded them in Spain; of the many attempted kidnappings and assassinations; of the time in Basra when they had fought with pistols and tommy guns and snatched-up clubs and flasks of acid to defend their laboratories.

A good team—before the rot of treason had touched it. He could almost smell the putrid stench of it, and yet, as he glanced from face to face, he could not guess the traitor. And he had so little time—

Kato Sugihara's voice rose to dominate the murmur of conversation around the table.

"I think I am getting somewhere on my photon-neutrino-electron interchange-cycle," he announced. "And I think it can be correlated to the collapsed-matter research."

"So?" von Heldenfeld looked up in interest. "And not with the problem of what goes on in the 'hot layer' surrounding the Earth?"

"No, Suzanne talked me out of that idea," the Japanese replied. "That's just a secondary effect of the effect of cosmic rays and solar radiations on the order of particles existing at that level. But I think that I have the key to the problem of collapsing matter to plate the hull of the spaceship."

"That's interesting," Sir Neville Lawton commented. "How so?"

"Well, you know what happens when a photon comes in contact with the atomic structure of matter,"

Kato said. "There may be an elastic collision, in which the photon merely bounces off. Macroscopically, that's the effect we call reflection of light. Or there may be an inelastic collision, when the photon hits an atom and knocks out an electron—the old photoelectric effect. Or, the photon may be retained for a while and emitted again relatively unchanged—the effect observed in luminous paint. Or, the photon may penetrate, undergo a change to a neutrino, and either remain in the nucleus of the atom or pass through it, depending upon a number of factors. All this, of course, is old stuff; even the photon-neutrino interchange has been known since the mid-'50s, when the Gamow neutrino-counter was developed. But now we come to what you have been so good as to christen the Sugihara Effect—the neutrino picking up a negative charge and, in effect, turning into an electron, and then losing its charge, turning back into a neutrino, and then, as in the case of metal heated to incandescence, being emitted again as a photon.

"At first, we thought this had no connection with the spaceship insulation problem we are under contract to work out, and we agreed to keep this effect a Team secret until we could find out if it had commercial possibilities. But now, I find that it has a direct connection with the collapsed-matter problem. When the electron loses its negative charge and reverts to a neutrino, there is a definite accretion of interatomic bind-

ing-force, and the molecule, or the crystalline lattice or whatever tends to contract, and when the neutrino becomes a photon, the nucleus of the atom contracts."

Heym ben-Hillel was sitting oblivious to everything but his young colleague's words, a slice of the flesh of the unclean beast impaled on his fork and halfway to his mouth.

"Yes! Certainly!" he exclaimed. "That would explain so many things I have wondered about. And of course, there are other forces at work which, in the course of nature, balance that effect—"

"But can the process be controlled?" Suzanne Maillard wanted to know. "Can you convert electrons to neutrinos and then to photons in sufficient numbers, and eliminate other effects that would cause compensating atomic and molecular expansion?"

Kato grinned, like a tomcat contemplating the bones of a fish he has just eaten.

"Yes, I can. I have." He turned to MacLeod. "Remember those bullets I got from you?" he asked.

MacLeod nodded. He hand-loaded for his .38-special, and like all advanced cases of handloading-fever, he was religiously fanatical about uniformity of bullet weights and dimensions. Unlike most hand-loaders, he had available the instruments to secure such uniformity.

"Those bullets are as nearly alike as different objects can be," Kato said. "They weigh 158 grains, and

that means one-five-eight-point-zero-zero-zero-practically-nothing. The diameter is .35903 inches. All right; I've been subjecting those bullets to different radiation-bombardments, and the best results have given me a bullet with a diameter of .35892 inches, and the weight is unchanged. In other words, there's been no loss of mass, but the mass had contracted. And that's only been the first test."

"Well, write up everything you have on it, and we'll lay out further experimental work," MacLeod said. He glanced around the table. "So far, we can't be entirely sure. The shrinkage may be all in the crystalline lattice: the atomic structure may be unchanged. What we need is matter that is really collapsed."

"I'll do that," Kato said. "Farida, I'll have all my data available for you before noon tomorrow; you can make up copies for all Team members."

"Make mine on microfilm, for projection," von Heldenfeld said.

"Mine, too," Sir Neville Lawton added.

"Better make microfilm copies for everybody," Heym ben-Hillel suggested. "They're handier than typescript."

MacLeod rose silently and tiptoed around behind his wife and Rudolf von Heldenfeld, to touch Kato Sugihara on the shoulder.

"Come on outside, Kato," he whispered. "I want to talk to you."

The Japanese nodded and rose, following him outside onto the roof



above the laboratories. They walked over to the edge and stopped at the balustrade.

"Kato, when you write up your stuff, I want you to falsify everything you can. Put it in such form that the data will be absolutely worthless, but also in such form that nobody, not even Team members, will know it has been falsified. Can you do that?"

Kato's almond-shaped eyes widened. "Of course I can, Dunc," he replied. "But why—?"

"I hate to say this, but we have a traitor in the Team. One of those people back in the dining room is selling us out to the Fourth Komintern. I know it's not Karen, and I know it's not you, and that's as much as I do know, now."

The Japanese sucked in his breath in a sharp hiss. "You wouldn't say that unless you were sure, Dunc," he said.

"No. At about 1000 this morning, Dr. Weissberg, the civilian director, called me to his office. I found him very much upset. He told me that General Nayland is accusing us—by which he meant this Team—of furnishing secret information on our subproject to Komintern agents. He said that British Intelligence agents at Smolensk had learned that the Red Triumph laboratories there were working along lines of research originated at MacLeod Team Center here. They relayed the information to Western Union Central Intelligence, and WU passed it on to United States Central Intelligence, and now

Counter Espionage is riding Nayland about it, and he's trying to make us the goat."

"He would love to get some of us shot," Kato said. "And that could happen. They took a long time getting tough about espionage in this country, but when Americans get tough about something, they get tough right. But look here; we handed in our progress-reports to Felix Weissberg, and he passed them on to Nayland. Couldn't the leak be right in Nayland's own HQ?"

"That's what I thought, at first," MacLeod replied. "Just wish-thinking, though. Fact is, I went up to Nayland's HQ and had it out with him; accused him of just that. I think I threw enough of a scare into him to hold him for a couple of days. I wanted to know just what it was the Komintern was supposed to have got from us, but he wouldn't tell me. That, of course, was classified-stuff."

"Well?"

"Well then, Karen and I got our digestive tracts emptied and went in to town, where I could use a phone that didn't go through a military switchboard, and I put through a call to Allan Hartley, President Hartley's son. He owes us a break, after the work we did in Puerto Rico. I told him all I wanted was some information to help clear ourselves, and he told me to wait a half an hour and then call Counter Espionage Office in Washington and talk to General Hammond."

"Ha! If Allan Hartley's for us, what are we worried about?" Kato



asked. "I always knew he was the power back of Associated Enterprises and his father was the front-man; I'll bet it's the same with the Government."

"Allan Hartley's for us as long as our nose is clean. If we let it get dirty, we get it bloodied, too. We have to clean it ourselves," MacLeod told him. "But here's what Hammond gave me: The Komintern knows all about our collapsed-matter experiments with zinc, titanium and nickel. They know about our theoretical work on cosmic rays, including Suzanne's work up to about a month ago. They know about that effect Sir Neville and Heym discovered two months ago." He paused. "And they know about the photon-neutrino-electron interchange."

Kato responded to this with a gruesome double-take that gave his face the fleeting appearance of an ancient samurai war mask.

"That wasn't included in any report we ever made," he said. "You're right; the leak comes from inside the Team. It must be Sir Neville, or Suzanne, or Heym ben-Hillel, or Adam Lowiewski, or Rudolf von Heldenfeld, or— No! No, I can't believe it could be Farida!" He looked at MacLeod pleadingly. "You don't think she could have—?"

"No, Kato. The Team's her whole life, even more than it is mine. She came with us when she was only twelve, and grew up with us. She doesn't know any other life than this, and wouldn't want any other. It has to be one of the other five."

"Well, there's Suzanne," Kato began. "She had to clear out of France because of political activities, after the collapse of the Fourth Republic and the establishment of the Rightist Directorate in '57. And she worked with Joliot-Curie, and she was at the University of Louvain in the early '50s, when that place was crawling with Commies."

"And that brings us to Sir Neville," MacLeod added. "He dabbles in spiritualism; he and Suzanne do planchette-seances. A planchette can be manipulated. Maybe Suzanne produced a communication advising Sir Neville to help the Komintern."

"Could be. Then, how about Lowiewski? He's a Pole who can't go back to Poland, and Poland's a Komintern country," Kato pointed out. "Maybe he'd sell us out for amnesty, though why he'd want to go back there, the way things are now—?"

"His vanity. You know, missionary-school native going back to the village wearing real pants, to show off to the savages. Used to be a standing joke, down where I came from." MacLeod thought for a moment. "And Rudolf; he's always had a poor view of the democratic system of government. He might feel more at home with the Komintern. Of course, the Ruskis killed his parents in 1945—"

"So what?" Kato retorted. "The Americans killed my father in 1942, but I'm not making an issue out of it. That was another war; Japan's a

Western Union country, now. So's Germany— How about Heym, by the way? Remember when the Komintern wanted us to come to Russia and do the same work we're doing here?"

"I remember that after we turned them down, somebody tried to kidnap Karen," MacLeod said grimly. "I remember a couple of Russians got rather suddenly dead trying it, too."

"I wasn't thinking of that. I was thinking of our round-table argument when the proposition was considered. Heym was in favor of accepting. Now that, I would say, indicates either Communist sympathies or an overtrusting nature," Kato submitted. "And a lot of grade-A traitors have been made out of people with trusting natures."

MacLeod got out his pipe and lit it. For a long time, he stared out across the mountain-ringed vista of sagebrush, dotted at wide intervals with the bulks of research-centers and the red roofs of the villages.

"Kato, I think I know how we're going to find out which one it is," he said. "First of all, you write up your data, and falsify it so that it won't do any damage if it gets into Komintern hands. And then—"

The next day started in an atmosphere of suppressed excitement and anxiety which, beginning with MacLeod and Karen and Kato Sugihara, seemed to communicate itself by contagion to everybody in the MacLeod Team's laboratories. The top

researchers and their immediate assistants and students were the first to catch it; they ascribed the tension under which their leader and his wife and the Japanese labored to the recent developments in the collapsed-matter problem. Then, there were about a dozen implicitly-trusted technicians and guards, who had been secretly gathered in MacLeod's office the night before and informed of the crisis that had arisen. Their associates could not miss the fact that they were preoccupied with something unusual.

They were a variegated crew; men who had been added to the Team in every corner of the world. There was Ahmed Abd-el-Rahman, the Arab jeep-driver who had joined them in Basra. There was the wiry little Greek whom everybody called Alex Unpronounceable. There was an Italian, and two Chinese, and a cashiered French Air Force officer, and a Malay, and the son of an English earl who insisted that his name was Bertie Wooster. They had sworn themselves to secrecy, had heard MacLeod's story with a polylingual burst of pious or blasphemous exclamations, and then they had scattered, each to the work assigned him.

MacLeod had risen early and submitted to the ordeal of the search to leave the reservation and go to town again, this time for a conference at the shabby back-street cigar store that concealed a Counter Espionage center. He had returned just as Farida Khourouglu was finishing the microfilm copies of Kato's ingen-

ously-concocted pseudo-data. These copies were distributed at noon, while the Team was lunching, along with carbons of the original typescript.

He was the first to leave the table, going directly to the basement, where Alex Unpronounceable and the man who had got his alias from the works of P. G. Wodehouse were listening in on the telephone calls going in and out through the Team-center switchboard, and making recordings. For two hours, MacLeod remained with them. He heard Suzanne Maillard and some woman who was talking from a number in the Army married-officers' settlement making arrangements about a party. He heard Rudolf von Heldenfeld make a date with some girl. He listened to a violent altercation between the Team chef and somebody at Army Quartermaster's HQ about the quality of a lot of dressed chicken. He listened to a call that came in for Adam Lowiewski, the mathematician.

"This is Joe," the caller said. "I've got to go to town late this afternoon, but I was wondering if you'd have time to meet me at the Recreation House at Oppenheimer Village for a game of chess. I'm calling from there, now."

"Fine; I can make it," Lowiewski's voice replied. "I'm in the middle of a devil's own mathematical problem; maybe a game of chess would clear my head. I have a new queen's-knight gambit I want to try on you, anyhow."

Bertie Wooster looked up sharply.

"Now there; that may be what we're—"

The telephone beside MacLeod rang. He scooped it up; named himself into it.

It was Ahmed Abd-el-Rahman. "Look, chief; I tail this guy to Oppenheimer Village," the Arab, who had learned English from American movies, answered. "He goes into the rec-joint. I slide in after him, an' he ain't in sight. I'm lookin' around for him, see, when he comes bargin' outa the Don Ameche box. Then he grabs a table an' a beer. What next?"

"Stay there; keep an eye on him," MacLeod told him. "If I want you, I'll call."

MacLeod hung up and straightened, feeling under his packet for his .38-special.

"That's it, boys," he said. "Lowiewski. Come on."

"Hah!" Alex Unpronounceable had his gun out and was checking the cylinder. He spoke briefly in description of the Polish mathematician's ancestry, physical characteristics, and probable post-mortem destination. Then he put the gun away, and the three men left the basement.

For minutes that seemed like hours, MacLeod and the Greek waited on the main floor, where they could watch both the elevators and the stairway. Bertie Wooster had gone up to alert Kato Sugihara and Karen. Then the door of one of the elevators opened and Adam Lowiewski emerged, with Kato behind him,

apparently lost in a bulky scientific journal he was reading. The Greek moved in from one side, and MacLeod stepped in front of the Pole.

"Hi, Adam," he greeted. "Have you looked into that batch of data yet?"

"Oh, yes. Yes." Lowiewski seemed barely able to keep his impatience within the bounds of politeness. "Of course, it's out of my line, but the mathematics seems sound." He started to move away.

"You're not going anywhere," MacLeod told him. "The chess game is over. The red pawns are taken—the one at Oppenheimer Village, and the one here."

There was a split second in which Lowiewski struggled—almost successfully—to erase the consternation from his face.

"I don't know what you're talking about," he began. His right hand started to slide under his left coat lapel.

MacLeod's Colt was covering him before he could complete the movement. At the same time, Kato Sugihara dropped the paper-bound periodical, revealing the thin-bladed knife he had concealed under it. He stepped forward, pressing the point of the weapon against the Pole's side. With the other hand, he reached across Lowiewski's chest and jerked the pistol from his shoulder-holster. It was one of the elegant little '32 Beretta 1954 Model automatics.

"Into the elevator," MacLeod ordered. An increasing pressure of Kato's knife emphasized the order.

"And watch him; don't let him get rid of anything," he added to the Greek.

"If you would explain this outrage—" Lowiewski began. "I assume it is your idea of a joke—"

Without even replying, MacLeod slammed the doors and started the elevator upward, letting it rise six floors to the living quarters. Karen Hilquist and the aristocratic black-sheep who called himself Bertie Wooster were waiting when he opened the door. The Englishman took one of Lowiewski's arms; MacLeod took the other. The rest fell in behind as they hustled the captive down the hall and into the big sound-proofed dining room. They kept Lowiewski standing, well away from any movable object in the room; Alex Unpronounceable took his left arm as MacLeod released it and went to the communicator and punched the all-outlets button.

"Dr. Maillard; Dr. Sir Neville Lawton; Dr. ben-Hillel; Dr. von Heldenfeld; Mlle. Khourouglu," he called. "Dr. MacLeod speaking. Come at once, repeat at once, to the round table— Dr. Maillard; Dr. Sir Neville Lawton—"

Karen said something to the Japanese and went outside. For a while, nobody spoke. Kato came over and lit a cigarette in the bowl of MacLeod's pipe. Then the other Team members entered in a body. Evidently Karen had intercepted them in the hallway and warned them that they would find some unusual situa-

tion inside; even so, there was a burst of surprised exclamations when they found Adam Lowiewski under detention.

"Ladies and gentlemen," MacLeod said, "I regret to tell you that I have placed our colleague, Dr. Lowiewski, under arrest. He is suspected of betraying confidential data to agents of the Fourth Komintern. Yesterday, I learned that data on all our work here, including Team-secret data on the Sugihara Effect, had got into the hands of the Komintern and was being used in research at the Smolensk laboratories. I also learned that General Nayland blames this Team as a whole with double-dealing and selling this data to the Komintern. I don't need to go into any lengthy exposition of General Nayland's attitude toward this Team, or toward Free Scientists as a class, or toward the research-contract system. Nor do I need to point out that if he pressed these charges against us, some of us could easily suffer death or imprisonment."

"So he had to have a victim in a hurry, and pulled my name out of the hat," Lowiewski sneered.

"I appreciate the gravity of the situation," Sir Neville Lawton said. "And if the Sugihara Effect was among the data betrayed, I can understand that nobody but one of us could have betrayed it. But why, necessarily, should it be Adam? We all have unlimited access to all records and theoretical data."

"Exactly. But collecting information is the smallest and easiest part

of espionage. Almost anybody can collect information. Where the spy really earns his pay is in transmitting information. Now, think of the almost fantastic security measures in force here, and consider how you would get such information, including masses of mathematical data beyond any human power of memorization, out of this reservation."

"Ha, nobody can take anything out," Suzanne Maillard said. "Not even one's breakfast. Is Adam accused of sorcery, too?"

"The only material things that are allowed to leave this reservation are sealed cases of models and data shipped to the different development plants. And the Sugihara Effect never was reported, and wouldn't go out that way," Heym ben-Hillel objected.

"But the data on the Sugihara Effect reached Smolensk," MacLeod replied. "And don't talk about Darwin and Wallace; it wasn't a coincidence. This stuff was taken out of the Tonto Basin Reservation by the only person who could have done so, in the only way that anything could leave the reservation without search. So I had that person shadowed, and at the same time I had our telephone lines tapped, and eavesdropped on all calls entering or leaving this center. And the person who had to be the spy-courier called Adam Lowiewski, and Lowiewski made an appointment to meet him at the Oppenheimer Village Recreation House to play chess."

"Very suspicious, very suspicious,"

Lowiewski derided. "I receive a call from a friend at the same time that some anonymous suspect is using the phone. There are only five hundred telephone conversations a minute on this reservation."

"Immediately, Dr. Lowiewski attempted to leave this building," MacLeod went on. "When I intercepted him, he tried to draw a pistol. This one." He exhibited the Beretta. "I am now going to have Dr. Lowiewski searched, in the presence of all of you." He nodded to Alex and the Englishman.

They did their work thoroughly. A pile of Lowiewski's pocket effects was made on the table; as each item was added to it, the Pole made some sarcastic comment.

"And that pack of cigarettes; unopened," he jeered. "I suppose I communicated the data to the manufacturers by telepathy, and they printed it on the cigarette papers in invisible ink."

"Maybe not. Maybe you opened the pack, and then resealed it," Kato suggested. "A heated spatula under the cellophane; like this."

He used the point of his knife to illustrate. The cellophane came unsealed with surprising ease; so did the revenue stamp. He dumped out the contents of the pack: sixteen cigarettes, four cigarette tip-ends, four bits snipped from the other ends—and a small aluminum microfilm capsule.

Lowiewski's face twitched. For an instant, he tried vainly to break

loose from the men who held him. Then he slumped into a chair. Heym ben-Hillel gasped in shocked surprise. Suzanne Maillard gave a short, feline-like cry. Sir Neville Lawton looked at the capsule curiously and said: "Well, my sainted Aunt Agatha!"

"That's the capsule I gave him, at noon," Farida Khourouglu exclaimed, picking it up. She opened it and pulled out a roll of colloidex projection film. There was also a bit of cigarette paper in the capsule, upon which a notation had been made in Kyrilic characters.

Rudolf von Heldenfeld could read Russian. "'Data on new development of photon-neutrino-electron interchange. 22 July, '65. Vladimir.' Vladimir, I suppose, is this *schwein-hund's* code name," he added.

The film and the paper passed from hand to hand. The other members of the Team sat down; there was a tendency to move away from the chair occupied by Adam Lowiewski. He noticed this and sneered.

"Afraid of contamination from the moral leper?" he asked. "You were glad enough to have me correct your stupid mathematical errors."

Kato Sugihara picked up the capsule, took a final glance at the cigarette pack, and said to MacLeod: "I'll be back as soon as this is done." With that, he left the room, followed by Bertie Wooster and the Greek.

Heym ben-Hillel turned to the others: his eyes had the hurt and puzzled look of a dog that has been



kicked for no reason. "But why did he do this?" he asked.

"He just told you," MacLeod replied. "He's the great Adam Lowiewski. Checking math for a physics-research team is beneath his dignity. I suppose the Komintern offered him a professorship at Stalin University." He was watching Lowiewski's face keenly. "No," he continued. "It was probably the mathematics chair of the Soviet Academy of Sciences."

"But who was this person who could smuggle microfilm out of the reservation?" Suzanne Maillard wanted to know. "Somebody has invented teleportation, then?"

MacLeod shook his head. "It was General Nayland's chauffeur. It had to be. General Nayland's car is the only thing that gets out of here without being searched. The car itself is serviced at Army vehicles pool; nobody could hide anything in it for a confederate to pick up outside. Nayland is a stuffed shirt of the first stuffing, and a tinpot Hitler to boot, but he is fanatically and incorruptibly patriotic. That leaves the chauffeur. When Nayland's in the car, nobody even sees him; he might as well be a robot steering-device. Old case of Father Brown's Invisible Man. So, since he had to be the courier, all I did was have Ahmed Abd-el-Rahman shadow him, and at the same time tap our phones. When he contacted Lowiewski, I knew Lowiewski was our traitor."

Sir Neville Lawton gave a stran-



gling laugh. "Oh, my dear Aunt Fanny! And Nayland goes positively crackers on security. He gets goose pimples every time he hears somebody saying ' $E = mc^2$ ', for fear a Komintern spy might hear him. It's a wonder he hasn't put the value of Planck's Constant on the classified list. He sets up all these fantastic search rooms and barriers, and then he drives through the gate, honking his bloody horn, with his chauffeur's pockets full of top secrets. Now I've seen everything!"

"Not quite everything," MacLeod said. "Kato's going to put that capsule in another cigarette pack, and he'll send one of his lab girls to Op-

penheimer Village with it, with a message from Lowiewski to the effect that he couldn't get away. And when this chauffeur takes it out, he'll run into a Counter Espionage roadblock on the way to town. They'll shoot him, of course, and they'll probably transfer Nayland to the Mississippi Valley Flood Control Project, where he can't do any more damage. At least, we'll have him out of our hair."

"If we have any hair left," Heym ben-Hillel gloomed. "You've got Nayland into trouble, but you haven't got us out of it."

"What do you mean?" Suzanne Maillard demanded. "He's found the traitor and stopped the leak."

"Yes, but we're still responsible, as a team, for this betrayal," the Israeli pointed out. "This Nayland is only a symptom of the enmity which politicians and militarists feel toward the Free Scientists, and of their opposition to the research-contract system. Now they have a scandal to use. Our part in stopping the leak will be ignored; the publicity will be about the treason of a Free Scientist."

"That's right," Sir Neville Lawton agreed. "And that brings up another point. We simply can't hand this fellow over to the authorities. If we do, we establish a precedent that may wreck the whole system under which we operate."

"Yes; it would be a fine thing if governments start putting Free Scientists on trial and shooting them," Farida Khourouglu supported him.

"In a few years, none of us would be safe."

"But," Suzanne cried, "you are not arguing that this species of an animal be allowed to betray us unpunished?"

"Look," Rudolf von Heldenfeld said. "Let us give him his pistol, and one cartridge, and let him remove himself like a gentleman. He will spare himself the humiliation of trial and execution, and us all the embarrassment of having a fellow scientist piloried as a traitor."

"Now there's a typical Prussian suggestion," Lowiewski said.

Kato Sugihara, returning alone, looked around the table. "Did I miss something interesting?" he asked.

"Oh, very," Lowiewski told him. "Your Junker friend thinks I should perform *seppuku*."

Kato nodded quickly. "Excellent idea!" he congratulated von Heldenfeld. If he does, he'll save everybody a lot of trouble. Himself included." He nodded again. "If he does that, we can protect his reputation, after he's dead."

"I don't really see how," Sir Neville objected. "When the Counter Espionage people were brought into this, the thing went out of our control."

"Why, this chauffeur was the spy, as well as the spy-courier," MacLeod said. "The information he transmitted was picked up piecemeal from different indiscreet lab-workers and students attached to our team. Of

course, we are investigating, mumble-mumble. Naturally, no one will admit, mumble-mumble. No stone will be left unturned, mumble-mumble. Disciplinary action, mumble-mumble."

"And I suppose he got that microfilm piecemeal, too?" Lowiewski asked.

"Oh, that?" MacLeod shrugged. "That was planted on him. One of our girls arranged an opportunity for him to steal it from her, after we began to suspect him. Of course, Kato falsified everything he put into that report. As information, it's worthless."

"Worthless? It's better than that," Kato grinned. "I'm really sorry the Komintern won't get it. They'd try some of that stuff out with the big betatron at Smolensk, and a microsecond after they'd throw the switch, Smolensk would look worse than Hiroshima did."

"Well, why would our esteemed colleague commit suicide, just at this time?" Karen Hilquist asked.

"Maybe plutonium poisoning," Farida suggested. "He was doing something in the radiation lab and got some Pu in him, and of course, shooting's not as painful as that. So—"

"Oh, my dear!" Suzanne protested. "That but stinks! The great Adam Lowiewski, descending from his pinnacle of pure mathematics, to perform a vulgar experiment? With actual *things*?" The Frenchwoman gave an exaggerated shudder. "Horror!"

"Besides, if our people began getting radioactive, somebody would be sure to claim we were endangering the safety of the whole establishment, and the national-security clause would be invoked, and some nosy person would put a geiger on the dear departed," Sir Neville added.

"Nervous collapse," Karen said. "According to the laity, all scientists are crazy. Crazy people kill themselves. Adam Lowiewski was a scientist. Ergo Adam Lowiewski killed himself. Besides, a nervous collapse isn't instrumentally detectable."

Heym ben-Hillel looked at MacLeod, his eyes troubled.

"But, Dúnc; have we the right to put him to death, either by his own hand or by an Army firing squad?" he asked. "Remember he is not only a traitor; he is one of the world's greatest mathematical minds. Have we a right to destroy that mind?"

Von Heldenfeld shouted, banging his fist on the table: "I don't care if he's Gauss and Riemann and Lorenz and Poincare and Minkowski and Whitehead and Einstein, all collapsed into one! The man is a stinking traitor, not only to us, but to all scientists and all sciences! If he doesn't shoot himself, hand him over to the United States, and let them shoot him! Why do we go on arguing?"

Lowiewski was smiling, now. The panic that had seized him in the hallway below, and the desperation when

the cigarette pack had been opened, had left him.

"Now I have a modest proposal, which will solve your difficulties," he said. "I have money, papers, clothing, everything I will need, outside the reservation. Suppose you just let me leave here. Then, if there is any trouble, you can use this fiction about the indiscreet underlings, without the unnecessary embellishment of my suicide—"

Rudolf von Heldenfeld let out an inarticulate roar of fury. For an instant, he was beyond words. Then he sprang to his feet.

"Look at him!" he cried. "Look at him, laughing in our faces, for the dupes and fools he thinks we are!" He thrust out his hand toward MacLeod. "Give me the pistol! He won't shoot himself; I'll do it for him!"

"It would work, Dunc. Really, it would," Heym ben-Hillel urged.

"No," Karen Hilquist contradicted. "If he left here, everybody would know what had happened, and we'd be accused of protecting him. If he kills himself, we can get things hushed up; dead traitors are good traitors. But if he remains alive, we must disassociate ourselves from him by handing him over."

"And wreck the prestige of the Team?" Lowiewski asked.

"At least you will not live to see that!" Suzanne retorted.

Heym ben-Hillel put his elbows on the table and his head in his hands. "Is there no solution to this?" he almost wailed.

"Certainly; an obvious solution," MacLeod said, rising. "Rudolf has just stated it. Only I'm leader of this Team, and there are, of course, jobs a team-leader simply doesn't delegate." The safety catch of the Beretta clicked a period to his words.

"No!" The word was wrenched almost physically out of Lowiewski. He, too, was on his feet, a sudden desperate fear in his face. "No! You wouldn't murder me!"

"The term is 'execute'," MacLeod corrected. Then his arm swung up, and he shot Adam Lowiewski through the forehead.

For an instant, the Pole remained on his feet. Then his knees buckled, and he fell forward against the table, sliding to the floor.

MacLeod went around the table, behind Kato Sugihara and Farida Khourouglu and Heym ben-Hillel, and stood looking down at the man he had killed. He dropped the automatic within a few inches of the dead renegade's outstretched hand, then turned to face the others.

"I regret," he addressed them, his voice and face blank of expression, "to announce that our distinguished colleague, Dr. Adam Lowiewski, has committed suicide by shooting, after a nervous collapse resulting from overwork."

Sir Neville Lawton looked critically at the motionless figure on the floor.

"I'm afraid we'll have trouble making that stick, Dunc," he said.

"You shot him at about five yards; there isn't a powder mark on him."

"Oh, sorry; I forgot." MacLeod's voice was mockingly contrite. "It was Dr. Lowiewski's expressed wish that his remains be cremated as soon after death as possible, and that funeral services be held over his ashes. The big electric furnace in the metallurgical lab will do, I think."

"But . . . but there'll be all sorts of formalities—" the Englishman protested.

"Now you forget. Our contract," MacLeod reminded him. "We stand upon our contractual immunity; we certainly won't allow any stupid bureaucratic interference with our deceased colleague's wishes. We have a regular M.D. on our payroll, in case anybody has to have a death certificate to keep him happy, but beyond that—" He shrugged.

"It burns me up, though!" Suzanne Maillard cried. "After the spaceship is built, and the Moon is annexed to the Western Union, there will be publicity, and people will eulogize this species of an Iscariot!"

Heym ben-Hillel, who had been staring at MacLeod in shocked disbelief, roused himself.

"Well, why not? Isn't the creator of the Lowiewski function transformations and the rules of inverse probabilities worthy of eulogy?" He turned to MacLeod. "I couldn't have done what you did, but maybe it was for the best. The traitor is

dead; the mathematician will live forever."

"You miss the whole point," MacLeod said. "Both of you. It wasn't a question of revenge, like gangsters bumping off a double-crosser. And it wasn't a question of whitewashing Lowiewski for posterity. We are the MacLeod Research Team. We owe no permanent allegiance to, nor acknowledge the authority of, any national sovereignty or any combination of nations. We deal with national governments as with equals. In consequence, we must make and enforce our own laws.

"You must understand that we enjoy this status only on sufferance. The nations of the world tolerate the Free Scientists only because they need us, and because they know they can trust us. Now, no responsible government official is going to be deceived for a moment by this suicide story we've concocted. It will be fully understood that Lowiewski was a traitor, and that we found him out and put him to death. And, as a corollary, it will be understood that this Team, as a Team, is fully trustworthy, and that when any individual Team member is found to be untrustworthy, he will be dealt with promptly and without public scandal. In other words, it will be understood, from this time on, that the MacLeod Team is worthy of the status it enjoys and the responsibilities concomitant with it."

THE END



# TO THE STARS

BY L. RON HUBBARD

*Conclusion. Corday was kidnaped, across the years as well as the light-years, isolated forever from everyone he ever knew. And the reason for it was necessity—a necessity he knew only when his captain died!*

Illustrated by Rogers

## Synopsis

*Space is deep, Man is small and Time a remorseless enemy.*

*In an ancient and forgotten age, Man first discovered the barricade. Before space travel first began he knew the barrier was there: It was an equation. Without that equation—the basic equation of mass and time—Man could not have progressed beyond barbaric fire. But*

*he did progress and he used fission and his mechanics became mighty and his hopes large. But the terms of his salvation were the term of his imprisonment as well:*

*AS MASS APPROACHES INFINITY, TIME APPROACHES ZERO.*

*Two mathematicians derived the equation first—Lorentz and Fitzgerald. And a theoretical philosopher,*

ASTOUNDING SCIENCE-FICTION

*Albert Einstein, showed its application. But if Lorentz and Fitzgerald and Einstein gave Man his Solar System, they almost denied him the stars.*

*And yet despite the difficulties derived by these great men—and confirmed first by nuclear physicists and then by actual use—there were still those who accepted and then defied the law: a small cohort of ships and men who, throughout the ages, kept the routes of space alive. The outcasts and the pariahs of extra-system travel, the cursed and shunned by Man, they coursed their lonely ways, far-bound but prisoners too, shackled fast by time.*

*Knowing well their waiting fate, who would volunteer to become a part of that thin group, knowing well their fate?*

*And yet, without his consent, ALAN CORDAY found himself an officer on the Hound of Heaven, interstellar vessel, outward bound across light-years and centuries. For a vessel approaching the speed of light in space cruised through time as well at a vastly accelerated pace. A voyage requiring a few months ship-time might encompass centuries.*

*Corday stumbled into the trap because of his need for a job on Mars so that he could rehabilitate his fortunes and marry his fiance.*

*CAPTAIN JOCELYN, strange master of the Hound, has taken Alan Corday forcibly in view of the Hound's need for an educated officer.*

*On the first run Corday makes, he is in partial ignorance of the operation of the velocity-mass-time effect and can only hope. He returns to Earth after what he considers a short absence.*

## X.

The cabbie skimmed along, driving with one hand, right arm over the back of his seat and his face, most of the time sideways to his passenger, animated with interest.

"Say, bub, ain't that a Martian ship or something? Never seen her like."

Alan loved the world just now. "That's the Hound of Heaven."

"Never heard of her and I know most of the regular runs."

"She's back from the long passage."

The cabbie gave a start, looked back through his rear window and then put on a little more speed. "Why doesn't somebody tell a feller these things? I was right there when she landed expectin' a good, all-night cruise around the fireworks dispensaries with a thirsty convoy. *Whew!* Glad you tipped me, bub. Them babies are man-hungry." He suddenly turned back to Alan. "Meanin' no offense, you understand. I didn't mean—"

"I'm through with her," said Alan happily. "And I know what you mean."

The cabbie was relieved. "Well, then! Don't get 'em in very often. Been two-three months since one of

them buzzards was around. And the cops stood ten deep tryin' to keep her from leavin'. But no use. Wonder why somebody don't keep a docket on 'em so's they'd control themselves. But heck, a police department can't hardly stay in power long enough to catch the same ship again. Read the other day where somebody was arguin' that they was a necessary evil, bringin' in occasional wealth and providin' the dockyards with work at fancy prices. But me, I can't see it. Now a nice, quiet clambake with a Martini run crew— You ain't told me what guzzle emporium we make first, bub. You been gone long?"

"Not very," said Alan with confidence. "And I'm not heading for a fast night."

"Well, you can have one, let me tell you, so don't make up your mind too fast. Ever since we got the church out of power, old New Chi has been runnin' wide-open and full-soused."

Alan nodded, preoccupied with his expectations, twenty-four thousand sweet in his pocket. And then the cabbie's remark failed to mesh properly with his thoughts. "I beg pardon?"

"Wide open!" said the cabbie. "There's Barracoon Bob's, for instance, where you get a glass of filleroo, an armful of—"

"I mean this church thing," said Alan, still determined not to take any news seriously.

"Well?"

"I mean you said since the

church was knocked out of power. I didn't know there was a church in power."

The cabbie looked back confusedly. "Look, bub. You sure you ain't had two or six already to-night?" And then he gave a shrug. "Forgot you was off that thing back there."

"What happened?"

"Oh, the whites fixed up a church to keep down the 'common people'. That was right after the last war."

"War? What war?" said Alan, his heart beginning to sag in spite of all he could do.

"Now see here, bub, all I know is what I learned in the eighth grade. THE war, of course."

"We won?"

"Bub, did anybody ever win a war? But maybe you can say the whites won. The Beggas Guild did all the fightin' and got killed off—"

"The what?"

"That's just slang for the 'People's Party', bub. They had a church of their own, so I been told. The Fission . . . no, the Electrician . . . shucks, some church or other. And the priests all got burned. Seen one when I was a kid. They were chasin' him down an alley and his hair was on fire. I—"

"I am very confused," said Alan. "What church won?"

"Oh, the white outfit wasn't a church, accordin' to what I been told. It was preached over the air and they used jawnotics or something like that."

"Hypnotics?"



"Well, take your choice. But whatever it was, the whites sure had people stepping out for a while. Then Conners started a revolution and overthrew that church and made up a new one called the Christian Church. I belong."

Alan was trying to jigsaw all this together on a time track.

"Anyway, you sure missed a lot of fun. Been years since we had any real trouble, but once in a while somebody will denounce somebody as a white and there'll be a fine hoo-rah and a firing party and free beer. We got a fine man in now: Justinus Murphy."

"What . . . who—"

"Republicanites, of course. Say, you *are* a republican, aren't you? I ain't supposed to drive nobody unless he is." The driver swiveled around and looked hard. Suddenly he yanked the controls and braked. Then he turned and opened the door.

"Bub, I'm sorry. But I'm not takin' any chances. This is a free country and everybody does what he likes and all that but I got to report it."

"See here," said Alan stiffly. "I have been gone for ten or fifteen years, true enough, but it has been a long time since a cabbie told me to get out."

"You're in the limits. And you can hoof it, bub."

Alan wondered whether he should strike the man or bribe him. He tried the latter and it failed.

"Nope. Sorry, bub. Can't take chances."

He was not used to brawling with menials and he stepped with dignity to the walk. He had some odds and ends of change as part of his pay and he extended a coin. The driver looked at it with contempt and he changed it to one four times the size which the driver accepted. It was the first time Alan noticed that he was carrying iron money with a glowing center. The bills he had barely noticed beyond their odd printing.

"Seein' you're playin' the grand duke," said the cabbie, "I'll comment that you better shuck that coat."

"Why?"

"It's white! Ain't that enough? Well, no hard feelings, bub, I . . . Judas Iscariot!" And he staggered back, pale.

Alan glanced wonderingly at his own chest. "What now?" he said, half angry.

"Look, bub. Suicide is all right in its place, but that place ain't in my vicinity. Don't walk ten feet without tearin' off that collar tab!"

"Why?"

"Why? Heavenly angels. The engineers, tenth class! I seen it in my history books, eagle, compass and all! Who do-you suppose took over the world?"

Alan felt a sudden surge of sickness. Not from danger at hand. Not from any realization that his one-time comrades had once been kings—but that *time* had passed.

"History books," he repeated dully.

But the hack was gone.

An hour later, fighting still a dread prescience, striving to ignore the unfamiliar buildings which stood beside familiarly named streets, Alan came to a small park. It was a square on the second level, open all the way to sunlight in the day and stars in the night. It had not changed. The benches and the street lamps were all the same and on one of those benches— He searched quickly and from what had threatened to engulf him he gave out a short, happy laugh.

Carved with a junior school scrawl and hardly obscured at all by paint was a heart, an arrow and two sets of initials: "A.C. lvs CM.". A silly thing, something to laugh about. They'd been young and it had been a second date and the moon had shone down through the holes in the upper squares.

"Silly kids," said Alan. He traced the initials. "Cerita Montgraine". Chica. Well, she was here some place in the city. He knew he would find her. Maybe she was a little older than he now. Maybe she was even gray, huh? But it had been his fault and she had promised and everything was going to be all right. He'd known a fellow, Jordan Cash in school, who had married a woman forty years old and they'd been happy as a couple of pigeons. What was age? What was age? The heart counted.

And it took an older woman to properly understand a man. Who had said that? Oh, yes, Queen. Fat, globulous Queen. She was right, too.

"Sure she was right, sure she was right," said his feet in cadence as he walked down the boulevard. "Sure she was right." And he fought away the gloom. But there was something else in his bootbeats on the pavement, something he couldn't completely forget. A glib, precise thing: "Mass times Velocity," sure, the Einstein equation, "equals Mass zero divided by the square root of one minus Velocity squared divided by Constant squared inclosed." Bootbeats.

He was looking for his parents' house, his own home. His mother would be pretty old now, he knew that. And his father was probably dead for the old fellow had been ailing ever since he had lost the firm and had had to give up the country place and his horses. But his mother at least would be living since she came from a long-lived clan and had never been ill a day in all her enthusiastic life. He felt guilty not to have worried about her in the last many weeks. But she'd understand about a young man being in love. And she'd know where Chica was.

And then he stopped, puzzled. He went back and looked from the corner and then came on again. There was something strange about this block and yet it was most certainly the right block. There should be a

garden wall— And then he sighed in deep relief. There was a garden well. And he shoved at the gate and the gate gave and he stepped inside.

"Hey, what's the matter with you?"

It was a strange man, a man in a dirty shirt shoving potted plants into a box. The place was a strange sort of hothouse without any glass or lights or vats for liquid food.

"I don't sell retail and I don't pay anybody but Jimson. So get out."

"I beg pardon," said Alan. "I was looking for the Corday residence."

"The what?"

"The Sir Alton Corday residence."

"Brother, this here is a paper box factory and I rent the yard. There ain't a residence on this whole square of town. I . . . what did you say?"

"The Sir Alton—"

"I caught it. You a government man? Because if you are, there ain't any white cash buried in this place. I dug it all up when I heard about it from my old man. Not a republican! Heard there was some white plate found over on Liberty Street last year, though."

Alan looked accusingly at the garden as though it had betrayed him. Here he had braved his first rocking horse and got his first licking for pulling up the zinnias. He came back to the presence of the man. "Would . . . do you suppose any-

body could tell me where the Cordays moved to?"

"Moved?" the man laughed and went back to stuffing plants in the boxes with expert economy of motion. Then he saw that Alan was still there and temporized. "You might ask next level down. The deacon that took over is an old bird and he knows the whole parish like a litany."

"I know the place well, thank you."

Alan braced up, thanked him and walked out. The gate clicked shut behind him, a small, remorseless and final click.

He felt a little dazed. Deceleration, he told himself. Being three or four gravities heavy for days made a man feel funny for a while.

The church was badly battered, shyly retired into a recess between two larger buildings. Alan noticed, when he saw its disrepair that the whole neighborhood was out at elbows, that the streets were rutted and cratered with mud oozing through broken pavement. This had been a large church once but it had lost both wings and its steeple. Odd to see it this way when he remembered it from such a short while ago as being a noble, imposing edifice with a broad lawn and skyholes through every level all the way up. Must have been set afire recently.

It was early and his knock at the small door was quickly answered. A wizened being in a black cloak answered and bobbed his head at every

word Alan spoke. But not to say yes. He continued the gesture throughout the interview and it was to signify "No."

"But my family crypt is here," said Alan.

"Family? Crypt?" *Bob, bob.* "You talk like a white, young man."

"May I see the crypts?" And he gave over a coin.

"Of course, of course. And the registers too, what's left."

But a yawning hole was in the floor and the flagstones and the names were mostly gone. Alan struck light to a votive candle and attempted to read some of the inscriptions by this flickering red glow. But although he recognized the family names of some tenth and eleventh class slabs, none bore Corday.

"Mighty puzzling," said the deacon, "just why you'd like to know," *bob, bob,* "but you're welcome to the registers—them that's left." *Bob, bob.* And he showed Alan a pile of moldy books.

But so badly were they burned along the edges that few of the pages could be read and Alan, hot wax unnoticed on his hand which held the votive light, found nothing.

"Let me see," said the deacon. "I recall a Strachay. You wouldn't want a Strachay?" And then, "Hey now. Wait. The slabs they used to repair the streets are some of 'em right side up."

Alan stared in disbelief.

"The slabs they filled the chuck hole with in front." *Bob, bob.*

"Come along." And he shuffled out into the darkness.

Alan had not noticed until this moment that the first level was not only badly lighted but not lighted at all. And he had to resort to a taper for which he paid a dollar.

He was scraping away mud with his boot when he was hailed. A man carrying a steady lantern came over and berated the deacon for "illegal sale of lights" and Alan's taper went out. He looked up to see a wolf-eyed man in rags glaring at him.

"You want light, you pay for light, my friend."

Alan was almost too distracted by his task to understand. He forced himself to answer. And he found himself cheerfully aided by a "dues paid member of the light guild".

They scratched and mucked for half an hour with the deacon bobbing about, recommending other chuck holes and then Alan stopped suddenly. A broken slab was marked "ay".

He dug about it, heedless of the muck, trying to find another piece of it. And the light bearer heaved up whiskey-laden grunts as he pulled and the deacon bobbed about excitedly.

But that was all.

"Tell you what," said the light bearer. "I got a couple of friends up the street in the messenger way of business and we'll send for a garden digger. That's if you've got money, of course. And we'll dig up the whole blamed street." This prospect enthused him and he stood

up to give the potential scene a glowing survey.

The deacon bob-bobbed that it would be a fine idea.

And then Alan saw them. He saw the mud and the ragged light bearer and the cloaked deacon and the street. He saw the church as it had been and now the church as it was.

He straightened. "Thank you," he said. "It won't be necessary. If you wish to accompany me, I will pay your hire." He turned with precision and paid the deacon who bob-bobbed thankfully. He indicated the way he would go to the light bearer.

And he turned his steps from the broken slab marked "ay".

## XI.

After walking for a long time, aimlessly, steadying himself, Alan found that they had come from under the levels and were in open country, surrounded by dilapidated shacks. He was confused as he recalled no such section, even though it was possible that during a lifetime he had not seen all of New Chicago.

"This is Brightpark," said the light bearer with the fondness of long acquaintance. "I got a place over here. Not bad. Six by six and I can near stretch out. Things have been getting better for us republicans right along. Less than thirty percent of the city is out of work and that's progress!"

"Thirty percent," said Alan, startled despite his glum thoughts. "I thought it was high at *ten* percent. But of course you're one of the thirty, I suppose."

"Me?" said the light bearer, insulted. "Believe me, I'm a laborer! Yes, sir. I'm one of the seventy. How'd you think I'd get a permit to light people along. I'm industry itself, employer. And to prove it I am going to stop right here and earn a guide tip. I go, I light, you follow. That's one thing. But there's nothing in my union rules—though there's plenty in the guide rules, but what they don't know won't hurt 'em—against my pointing a couple of things out that you want to know. Where we going?"

"I have been trying to orient myself," said Alan, with considerable more truth than he knew. "This is Brightpark. I was trying to reach Brightpark. But this is not the Brightpark I know. I have made some kind of an error. Or you have. I am looking for a place that is mostly lawns, big houses and stables. Surely you must know where the racing crowd lives."

"Employer, the only racing that's done around here is cockroaches. And I can prove that by the fifty cents I lost last Monday. And this is the only Brightpark we got. You might be fussier than some, but just the same this is the Brightpark you're going to take because it's all there is."

"Granted then that the place has been . . . been subdivided. I see

here to the right and left a few old homes sticking up through this rubbish. I am looking, specifically, for the Montgraine residence. Their country residence, that is, if you don't mind the old conceit of calling this country under the shadow of the levels. The home was called Sunnyslawn."

"Sounds like a cemetery," said the light bearer. "Well, if you don't mind payin' a little extra for the guidin', what was the exact and precise address?"

"No address. Just Sunnyslawn. The Montgraine residence. Everybody—"

"Everybody knows the place. I know. I've done guiding before this, employer. You . . . you *do* have money, don't you?"

"Of course."

"All right. There's a Montgraine Road over here about a dozen blocks. You remember what I said about extra fee."

"If it is the right place, I will double the fee," said Alan.

The light bearer promptly doubled the fee to be doubled in his own mind and led off at right angles, down through a series of broken streets and garbage strewn alleys.

"That's my place over there," he volunteered. The government built this whole section up about five years after the last war and they did a pretty good job, I been told. But it's kind of gone to seed now, I'll admit. This ten by ten lot division is a good thing, I maintain. Let's a man have a place in the good,

clean open air, a house near big enough to stretch out and plenty of space left to cook in when it don't rain. There's the street."

Alan looked at the unfamiliar landscape. There were no lights, a fact which his light bearer explained was due to the need of employment for light bearers, but there was a general glow from many windows and it was possible to see contour. Sunnyslawn had stood on a knoll.

"Is there a hill around here?"

"The guiding fee being in full force," said the light bearer, "there is." And he trudged off toward it.

From afar it was possible to see, in this dimly lit area, that Sunnyslawn was hardly a house and grounds any more. The grounds were chewed into small bits on which crouched buildings not much bigger than dog kennels even if they were occasionally two-storied. But above them loomed a building. Alan recognized, at last, the barn where old Montgraine had kept his flashy trotters. He walked further, through a maze of tiny streets and over a slippery crust of garbage and mud, to find the house itself, apparently intact, rearing above him.

His heart skipped. Many of the windows were lighted and how familiar it looked! He outdistanced his guide-light bearer and came around the corner to the front porch. He was a little startled to find the place inclosed for the verandah had been large and one of the principle beauties of the house.

But he went swiftly to the door.

Surging optimism placed no slightest doubt between him and the rack of cards he found there. He swept aside this obvious evidence that the place had been chopped into apartments and lighting his lighter, against all rules of the Light Bearers' Guild, he found her name!

"Miss Cerita Montgraine."

Well!

He whirled on the bearer, gave him a bill hit or miss from his roll, told him a happy good-by and pressed hard on the bell.

He waited. He straightened up his jacket, adjusted his collar, wished he had taken a moment to remove some of the stain of the *Hound*, realized how grimy his jacket was and took it off.

Apprehensively he punched the bell a second time. He was not worried. It was not really late yet. She would be up.

Chica. Well, he'd have to do some fast explaining at being gone so long. And he'd be very well braced against seeing her older than he had really expected. Make her as old as could be. That was all right. It was his fault and they could tie something together and make a life of it. What if she was even forty-five or fifty. That was all right. A woman needed some age to take proper care of a man. Who had said that? Queen? Funny old Queen. And he'd been up there where the stars were shining and he'd thought he'd never get back. What an entire fool he was. Joce-



lyn was right. He was a fool. He'd figured he'd never get back and here it was right on the bell, "Miss Cerita Montgraine". And how he'd watched that speed dial!

He wished he'd taken a little more time. He had mud on his shoes. Water wasn't plenty on a long passage. Well, she'd understand all that. She'd waited, hadn't she? She'd waited!

And there were footsteps on the porch within and the door opened a slit.

Alan beamed and got ready to grab her in his arms.

But it was a sad-faced little dwarf of a man, and he said, "Go away."

Alan chuckled. What a ragged tramp he must look. "I am sorry, I have no card to send in. But I'm a friend."

He couldn't resist the surprise factors involved in it. How she'd laugh with him.

"No friends. If you want money. No money."

Alan blocked the door from being shut. He grinned good-humoredly. "Truly I *am* a friend. An *old* friend."

"Nope. Take your foot out." The man was frightened.

Hang it, he'd have to forego the surprise. Maybe it was better. He'd scare her enough, turning up from the dead. "Don't be afraid. Nobody is going to hurt you. Announce"—he drew a breath—"Mr. Alan Corday."

The dwarf peered near-sightedly

in the dimness. "You ain't government?"

"No, truly I assure you I am not."

"This ain't no trick? 'Cause if it is, I got some sharp medicine I give to them that's ailin'."

"Friend, this is no trick. Your mistress will know me instantly."

"Well, I doubt that. But, keepin' in mind my sharp medicine, you can come up."

"I think you had better announce me first."

"She's ready to be looked at," said the dwarf. "And you mind the medicine." He opened the door and hobbled across the porch and up the stairs.

At the back of the house he stopped and swung open a panel. He looked in, nodded to himself and said, "Miss Chica. Miss Chica! Gentleman to see you callin' himself Mr. Alan Corday. Miss Chica, you wake up. Gentleman to see you."

A thin little voice answered him. "I'm awake, Saib. I'm not in bed, am I? Of course I'm awake. I'm dressed so I'm not in bed."

"Gentleman to—"

"Here, let me!" said Alan, and thrust the panel wide.

He was not certain what he saw, after the first glance. Afterwards he could not recall where she had sat or how she had looked.

There was a mantle with some crockery on it, some overcrowded tables with China dogs and horses on them, several heavy chairs and



a very narrow, covered bed.

"Is it going to rain? All day long I have felt it was going to rain. It isn't raining, is it?"

"Gentleman to see you!" Saib insisted sharply. "You got to talk up, mister. She don't hear well. But she's sprightly. Dresses herself."

"Oh, yes, of course, how foolish of me. Well, sir. See you now. Do be seated. And what was the name?"

Saib said, "Mr. Alan Corday."

There was a brief, puzzled silence. And then, "But he isn't in."

Alan sat down on a frail little rocking chair.

"He isn't here," she repeated in some distress, twisting her tiny, shriveled hands together.

"Mister, don't you go frettin' her," said Saib menacefully. "She's a tenth class but she's got her amnesty, because of her mind, you know. Recollect what I said about medicine and don't fret her."

"I was just about to have tea," she said. "Saib, bring in the tea things and serve the gentleman. I know I am dreadfully impolite not to be more hospitable but ever since my husband died I have kept alone pretty much you see. You knew him? A fine man. So strong and handsome. And such a way with him. He was an engineer-surveyor and when he came back we were married. You'd have liked him. I don't see very well but you look young. Are you young, sir? Excuse an inquisitive old lady, but

perhaps you knew one of our sons in school. Ah, there's the tea. You'll have one lump or two."

Saib put down the tray. It was a barren tray, a heel of bread, a tiny pat of butter and a teapot. She poured shakily and sought to place his cup beside him. Saib quickly assisted her an instant before disaster.

"Heavens, you'd think I couldn't do a thing," she said. "But you were telling me about one of my sons. Was it Raymond? What a good boy, he is. Writes me every week. You do think he's handsome, don't you?"

She sipped at her tea and set it aside. "It does feel like rain. Was it raining out when you came in? I keep feeling it is going to rain, Saib. Is it raining yet?"

"No, miss. It's not raining," said Saib. "Maybe you didn't hear. This is Mr. Corday."

Her hands shook badly as she lifted the teacup. She appeared to be very confused, peering about her, shaking her head slightly, trying to reach some memory.

"Oh," she said with relief, "you mean young Alan. Why, young man, I'm awfully sorry. Young Alan just isn't at home. He went out about an hour ago with some girl. Heavens, what a dangerous man he is. Broken hearts and the best families. But he'll settle down. Don't you worry about any son of mine, sir. They'll all be a credit to their father. All of them, sir. All of them."

Alan was standing, tearing at his cap.

"Oh, do you have to go so soon. And it's such good tea tonight. Real tea, but Saib is such a dear child. Can't you stay until Alan returns? Until Alan returns? Until Alan returns?"

"Here, here," said Saib. "You are spilling your tea and getting the rug all wet. You better go, sir. The old lady won't take excitement. Her heart, you understand. And she's had a mighty promisin' day so far."

"Good-by," she said brightly. "Good-by and do call again. I so enjoyed your news about young Alan. Saib, have them bring around a car for Alan's friend. It might rain, you know. Good-by, sir. Good-by."

Saib took him to the outer door. "She has her good days and her bad, good and bad. Today's a good one. The doctor'll be happy to hear it when he comes tomorrow. He's an old white like myself—drove for Greeson Graham in the old days, I did, and would have paid for it with my neck if they hadn't needed somebody to tend what was left of the stables. Then the doctor two years back talked them into letting me take care of the old woman there. Got to liking her right well. Funny old sort. You wouldn't know what happened to her, would you? I mean what drove her mad? Well, maybe it was the revolution. It got a lot of them. But somebody said she was crazy even before that and

they didn't execute her because . . . well, I don't know. She's a good sort and she doesn't talk much. Most words I ever heard her speak was tonight. And I feel better serving a tenth class. Used to their style, I guess. But don't take no truck about her family. Shucks. She wasn't ever married and she sure hasn't got any sons."

He opened the door for Alan. "Here, what's this Money? Say, this is an awful lot. Well, the old lady can use some food, that I guarantee. Say, this is a lot of money! Well, you can trust me to stretch it out, though I guess she hasn't got much more time. Must be eighty now. I don't get you, sir. You never said what you come for. What did you come for, mister? This money?"

Alan, two hours later, found himself walking in the rain she had feared. It was a heavy rain and it soaked his white jacket through and through.

He stood for moments and looked at the lowering sky, gray in the lights of the town.

She had said she thought it would rain.

## XII.

The quivering *Hound of Heaven* hurled herself on course, blazing bow to bridge with particle flame, drives snarling with subdued ferocity as they sped to higher speeds, a lance of fire in the black of absolute zero.

In two ship-years the bridge had

not changed much. There was a new communicator man on his watch, the old one dead in a fight on the Capella System; the glass had broken all the way out of the speed dial; and Swiftly sometimes shook now as he relieved the watch. But otherwise it was the same, a belt of black ports through which one saw the march of stars, a worn deck which was never washed, panel on panel and rack on rack of meters, dials and controls scummed each one with grease.

Alan leaned against the rail in the wing, fingers hooked in the spaceman's habit of never going far from a handhold and never being unprepared against ungravity. It was the secured watch with a minimum crew on stations. An hour since they had "piped the belly" and the food smell was still strong in the ship, but weakening as the blower filters cleaned the always foul air, and the crowd, a hundred and fifty-some strong, was in the messhall still, having an impromptu sing.

The quartermaster had left the ladder open so that they could hear on the bridge and up it floated the exultant strains of "Viva la Company".

*A friend on a left and a friend on  
the right,  
Viva la company.  
In hale and good fellowship let us  
unite  
Viva la company.  
Viva la viva la viva la Hound*

*Viva la viva la viva la Hound  
Viva la Hound viva la Hound  
Viva la company.*

The steersman started to hum it into the ensuing quiet. "Silence on the bridge," said Alan Corday.

The throb of the big ship seemed louder and more intense at the song's end and the belt of ports was blacker. Alan looked at the speed dial. They were rushing upwards now to one hundred and fifty thousand miles a second. They would have their speed in a few more watches. She was always uneven through the hundred forties and he was glad to be out of them. The Deuce thought it was a fault in her fuel catalysts. Ever since these new drives had been installed ten trips ago she'd had that characteristic. But she was beating at it now. One could barely see the needle move. It was less tiring on the crew through the hundred fifties and up for one's weight eased down as the gravity curve decreased. But she had to work for it and one could feel her throbbing by touching his finger to the rail.

They were singing again, "The Spaceman's Dream". And Alan beat slow time to it with his pencil, delaying a change course compute for spatial curve until the song was done.

He had made some progress in his navigation in two years. All the minor computations he did now. But his ears still burned when he

thought of Jocelyn's discovery of a tenth of a second error in his compute one day.

"I don't misdoubt, Mr. Corday, that some day when I am old and bent you'll have mastered simple trig. Mr. Hale, loan Mr. Corday a book on sphericals. You won't need one on arithmetic too, will you, Mr. Corday?"

He stabbed the pencil into the pad recalling it and looked up half expecting to see Gow-eater close by, on guard. But Gow-eater was a suicide these past eight months, and Alan, while very far from third in command, went about his work alone.

As the song finished he looked again at the speed dial and then to the course checkers and began his compute for curve.

They began to sing "Voyage," timed to the thud of drives.

*Up into the darkling sky  
The Hound her bow has reared  
Up against the cold, clean stars  
Her course is set and steered.*

*And high above Capella looms,  
A pinpoint in the sky  
While drivers throb and meters bob  
A thousand years will die.*

*The captain he has checked the  
course  
The mates are standing by  
We'll take our chance with meteors  
And check commands gone by.*

*We'll stand out to Capella's glare  
And thunder at the black  
And lance the way and never stay  
Until we've made the rack.*

*The daylight's thin behind us now,  
The careless stars are dim,  
The weakest of the Circus crew  
Is certain that we'll win.*

*A full ten times a hundred years  
Will pass as on we run  
A full ten times a hundred years  
Earth spins around the Sun.*

*Then back we'll be with ore and gem  
Enough a town to buy  
The Hound but six months older  
now  
For only planets die.*

*God bless the mates  
And keep our crew from harm upon  
this day  
And God bless Captain Jocelyn  
Who walks his lonely way.*

Alan squirmed a little. The song was very old and, as it died away, he was conscious suddenly of how slightly he belonged, how casual was their acceptance of him. With a sudden shock he realized that in more than two years of cruising he had not made a friend.

He was Mr. Corday, the young man who might some day become third in command, someone to be obedient to by duty and custom, someone to consult on routine matters, the person to see when you wanted minor hull repairs.

ASTOUNDING SCIENCE-FICTION

But he knew suddenly that he had never belonged. Wrapped in his own griefs and dismays, he had forgotten the ship. And he looked back now over the last two years with the strange sensation that he had never been quite within the hull.

There were reasons for it, he told himself quickly. There was the matter of mutiny. Not the one Queen had contemplated, but one which had almost won, engaged upon by five new men taken on Venus from a wrecked system-liner crew. He went shaky even now when he recalled the apprehension of them and the execution.

Jocelyn with the crew assembled except for a skeleton watch, had read quietly out of a small book called the "Holy Bible," had dropped a dispassionate hand and one by one, without suits, the five had been dropped from an air lock into the instant extinction of vacuum and absolute zero.

He recalled suddenly the conversation between Gow-eater and Mag Godine.

"But they froze first!" Mag had said. "So they don't explode."

"They explode first," Gow-eater had answered heatedly. "They never get a chance to freeze."

"I tell you," said Mag, "that they go floating around like planets, froze stiff."

"And I tell you," Gow-eater had said, "that they become, instantan and without delay, a pale, pink mist of plain ordinary atoms. So there!"

They'd never settle it. Odd that

they, who had been so long in space, with ample examples to cite, had brought no facts into the argument. It had ended with personal recriminations and Mistress Mag had not spoken to anyone for days.

And watching them it had come belatedly to Alan how narrowly close he had come to that same fate. It had made him very humble to Jocelyn, the thought of it. And to this day he had never spoken to either Strange or Queen without a surge of shame.

Not fear, he realized suddenly, standing here on watch, listening to a new song, shame. For Jocelyn had picked him up and brought him back that time after his first trip and Jocelyn had been almost kind. And he had once been a partner to a plan which would have murdered, as its very first step, Captain Jocelyn.

He was suddenly nervous about it again. He did not understand Jocelyn, but then nobody did. Strange, cold Jocelyn, always meticulously dressed in white, always biting, never affected by anything. Jocelyn and his whiskey and headache powder. Jocelyn and his command of strange and ancient music. Jocelyn and his sixth sense about the ship. And Jocelyn, ruthless, without principles or ethics or morals—Alan understood no part of him. And he detested the man entire.

They began to sing "Why, Why, Why Do We Cruise The Useless Sky," and Alan, for the thousandth

time faced that. And as it rolled, rollicking, satirical, poking ridicule at one and all, he again felt the never quite absent surge of desperation.

They had no purpose. They had no goal. They were outcasts, condemned to exist until they died without home or friends behind the skin of this vessel, accomplishing nothing, idly watching the parade of the pointless centuries. Why?

Toward the end of the watch Hale wandered up full of dinner and songs sung, smoking a terrible cigar, to check their position of advance, always an uncertain thing before speed was attained. Alan watched him for a little while.

"Well, looks like we'll be on Earth again in about nine hundred watches," Hale complacently roared to the bridge in general.

Alan spoke up suddenly: "Why?"

Bueko Hale looked at him in astonishment. He gawped for a moment and then, about to lose his cigar, worked it over to the other side of his huge mouth.

"We could have stayed on that last planet," said Alan.

"Could have—" began Hale, wits accelerating slowly.

"Water, game, timber, fine climate, no dangers, small colony already started. I looked it over. Didn't you?"

"Stayed on . . . on O'Rourke?" said Hale.

"Why not? We could do worse. We've got odds and ends of the

crafts aboard. We have a government. And we could live our lives like people."

"Live our lives—? What are you? Drunk?"

"Give me a good reason against it."

"Why, why . . . there's plenty against it. I—" And he floundered and began to get angry because he didn't have an answer.

"We play tag with disaster every trip. We'll get back to Earth now and who knows what we'll find. Certainly things will have changed in the fifty generations we've been gone. We'll have no more command ground with Earth this time than we had last. They don't want us. They've got no use for us. When we get a cargo they'll clip us badly because they knew that not even their great-great-great grandchildren will ever lay eyes on us. We serve no planet in the stars that really needs us. Now tell me why we didn't stay on O'Rourke and live like men."

Hale looked irritably around and drew himself up toward the explosion point. "You tryin' to breed discontent? If you don't like to make a good liberty, then some people do. If you don't like sport and plenty of money, that don't mean we're all little gents. And," he cried, his voice rising and strained, "if you don't like it, hit ~~dart~~ next stop! You don't have to stay aboard!"

And Hale departed.

Alan had stiffened at the last blast. He stood now, crimson, furi-

ous. He knew they could do without him. Jocelyn said it often enough. He knew he didn't really belong. But it was not fair of Hale to strike so hard with it in answer to a simple question.

But was it simple? When he thought of his last trip in he wondered. The language had changed so much that he had been very poorly understood. For that matter, he wasn't even speaking good English by this time but ship patois and "on dirt", trade pidgin, the timeless lingua spacia. His own technology was thirty-five hundred years forgotten and rusty on Earth. To fit himself in to that society now he would have to start in the first grade and study everything from grammar to manners. He did not belong on Earth any more. He was homeless, a wanderer in absolute zero and eternity. But Hale need not have driven it so hard.

He frowned. Jocelyn liked his creature comforts. Why didn't Jocelyn see how really easy it would be to make a new colony of his ship on some hospitable star? Earth, no. But a good planet in an astronomically reliable system—why not?

And then he recalled the brutality of some of their visits and the greed and licenses of the crew. Those, he thought disheartened, were answers.

### XIII.

"She's a bloomin' antique," said the yard superintendent, "but I

think she can be patched."

Alan was somewhat astonished to find himself nettled at the attitude of this shirt-sleeved Earthman. It seemed to him, each trip that the race was not quite as vital as the last time he had contacted it. And this slur against the *Hound*, whatever the curses Alan himself gave her, was not to be tolerated from such plebeian lips. He got out the first syllable of a biting rejoinder and then altered his tone in mid-flight. No professional ethics were ever used on a long passage ship, not in any age, and the lives of all aboard might depend upon the good will of this fellow.

"I am sure you can do something," said Alan. "Of course, as usual, you won't have any spare parts for her machinery but I think we can reinstall whole units where any spare parts are required."

The yard superintendent looked suspiciously at him. "You're just a young fellow to be talking so handsome. You got authority for such expenditure. It'll come to a fine piece of money."

"I am in charge of construction," said Alan, holding hard to his temper. "And I have authority to expend any necessary sums for her repairs."

"Hm-m-m. Now you take that hole in her bow, there. These old false nose jobs aren't so easy to patch up. Have to remove all the collision packing to get meteor chunks out, if any, and build up new braces and coilspring bulkheads . . .



cost . . . hm-m-m," a calculating glance at Alan, "cost around, say, hundred and twenty thousand tylers, more or less."

Alan pulled out a small book and made a pencil calculation on the fly-leaf. He could not convert various currency changes and his engineering had been taught to him in dollars. He used the price of a dish of ham and eggs as his medium of conversion, those having cost, in the average restaurant, about a dollar in his time. This proposed repair was then about thirty thousand dollars, according to his check of the local spaceport restaurant.

"Thirty thousand," he muttered. "Can't do business for more than a hundred thousand tylers."

"Have to skimp the work," said the yard superintendent dolefully.

"Even," said Alan, lowering his voice, "if you get a personal two thousand tylers on satisfactory completion."

The superintendent glanced swiftly around and then winked. "You long passage johnnies got a whole

book of tricks. Draggin' the ages."

Half the conversation he heard, even when it was conducted in what they called *lingua spacia* in the professorial handbooks, was beyond him now. Alan was developing the unconscious conviction that wherever he went he dwelt with foreigners. He would have contested this in an argument for it is a foolish idea indeed to have one's country, socialistically, linguistically and ethnologically, all contained in a metal hull.

"Now there's the matter of air tanks," he said. "I suppose you have something new in filters or motors."

The superintendent grew cunning. What they called the mechanical renaissance was hard upon Earth and secondhand equipment was easy to find, so rapid were designs changed. He knew of some old units he could get cheap—last year's. Alan looked them over, puzzled out their principle, finally studied out that they broke air into individual atoms and used the unwanted im-



purities for power. Then he deduced that there must be newer equipment from the signs of material progress he saw all about him, demanded it and secured it, shining in its packing crates.

"This afternoon," said Alan, having settled price on this, "I will run up to New Chicago and get checking estimates. I—"

"To where?"

Alan turned and looked north to where the city sprawled, sixteen levels high, suburbs extending eight hundred miles all about.

"You mean Candia," said the superintendent. "I recollect somebody sayin' there was another town here once, but Candia's been around—let me see—darned if I know. Maybe six-seven hundred years. Real old. We got some buildings they say go clear back to the Third Triarchy. Oldest in Halloland."

"Where?"

"Holloland, the continent."

"You mean North America."

"Can't say as I ever heard of that. But about these estimates. You can trust me. Point is, can I trust you?"

"Don't worry about pay," said Alan. "We were unloading half the morning, or didn't you notice?"

"Sure, but unloading what. You long passage boys get some mighty peculiar ideas about cargo sometimes. Saw a ship in here last May on your crazy business and she'd brought rocks. Just plain rocks."

"Must have been more than that,"

said Alan. "Nobody would haul rocks fifty or a hundred light-years."

"Yep, rocks. We had a lot of trouble with that outfit. They was crazy as loons, the whole lot. Claimed the stuff was called uranium."

"Had a use once," defended Alan.

"You couldn't prove it by me. We looked it up in every book in sight and couldn't even find it. I got a whole library out of the *Wanderbar IV*, thousand year old stuff. Swapped the skipper even, sold half as rare books, kept the engineering. And no uranium. Just rocks."

"But what do you use as fuel?" said Alan.

"Sand."

Alan blinked. "Well, took 'em a long time. Low order fission, well, well."

"Low order what?"

"Fission."

"Brother, we ain't got it."

"How do you burn the sand?"

"Pour cataphan on it. Runs about two million H.T.U. of heat to the jig."

"What's an H.T.U. and what's a jig? And what's this cataphan?"

"Sonny, I ain't got time to teach school today. Swap you a complete handbook and a dictionary for that gun you're packing. Be quite a find to the museum. They really hang around me in case you boys may come in. Got a flag one day off ship called *Molly Murphy*. Red, white and blue. Stars. Pretty. They'd been half across the galaxy, I guess.

Six thousand years or so. Price they got for the junk they had aboard made up for the cargo of diamonds. Six tons of diamonds. They're over there on the other side of that shed. You got any more of those guns, I'll swap you two burners, brand new for each."

"And a burner?"

"Side pistol you'd say. Two thousand rounds, Cataphan."

"What's this cataphan?"

"Here, come in," and he took Alan into the shed office. He picked up a phial and held it to the light. It contained perhaps a quarter of an ounce.

"That's a jig of cataphan. Two thousand tylers worth. They get this stuff out of Pluto. It's an ore extract. Here, give me the gun and you can have the books here. Read?"

"Make a try," said Alan.

"Well, here's a dictionary in and out of lingua spacia. Had them made up by the museum to accommodate you boys. Maybe six or eight of you come in here a year and while our main business is the Saturn Line and the Sun Excursion Company, we got to be accommodatin'. Got the only old racks that will take you boys anywhere on the continent. And we mean to oblige. Now this bill you mean to run up here is around two million tylers. You sure you'll have cash."

"We brought in an eight billion tyler cargo of furs," said Alan.

"What kind?"

"Lotus of Mizar puronic."

"Gosh. You did? Say, you boys must not care what you do. And that's smart. I seen one once on a ritocrats girl friend. All yours gold?"

"Some scarlet taken in the cold season."

"Hey now, don't let yourselves get skidded. My guess is they're worth twenty billion if anybody ordered eight, just on the principle. Women will be women"

"What's this cataphan's ore?" said Alan.

"There in the book. Small deposit on Pluto only one known. Here's a chunk of the ore. Like to help you boys out if—"

"*Whew!*" said Alan, unbending in his excitement.

"Ahah! You've seen it?"

"A mountain of it, shedding lava."

"That ore is worth five hundred tylers a jig. Here, have a smoke?"

Alan reached for the box and it was almost withdrawn.

"Go ahead. But I just remembered that I won't even be dust when you come in here again. But have a cigar anyway. After all we'll be making ten percent of two million off you boys. Go ahead and have two cigars."

Alan made the final arrangements for racking the ship in the morning and hastened up the gangway. Most of the crew was "on dirt", spending. But Snoozer was sitting inside the lock.

"Jocelyn aboard?"

"He's got some people up there," said Snoozer, brushing out the folds of a scarf she had wheedled out of a peddler. "Are you going townside, Mr. Corday?"

But Alan was up the ladder and into the big cabins in a rush. He had the ore in one hand, the dictionary and engineering book in the other. "Sir—"

"And I assure you, gentlemen," continued Jocelyn blandly, "that no other spot is so admirably suited to a colony. Good air, unit gravity, edible plants, Earthlike animal life. Johnny's Landing is, I am sure, the ideal place."

Alan stopped still, unable to believe what he heard. His own recollection of Johnny's Landing was pungent with death and disappointment. He stood back.

"This is Mr. Corday," said Jocelyn, "our second mate. A most talented and accomplished young engineer, a good example of the high caliber of our personnel. Regiment Hauber, Mr. Corday."

Alan found himself shaking hands with a white-haired, serene-faced old man who, in turn, introduced him to the four other members of the party.

"Your Captain Jocelyn," said Regiment Hauber, in halting lingua spacia, obviously but newly learned, "has been acquainting us with some of the prospects. Now what do you think of Johnny's Landing for a new colony, young man?"

Alan started to speak in a rush but he was halted by a flash in Joce-

lyn's usually languid eye.

"He thinks highly of it," said Jocelyn. "He was once there. These gentlemen head up a potential colony, Mr. Corday. We may have the pleasure of carrying them and their equipment. Now tell these gentlemen frankly what you know of Johnny's Landing. Is it fertile?"

"Yes, I—"

"And unit gravity?"

"Of course, but—"

"And you saw no animals except those useful to man?"

"No, they—"

"And water and air were good?" said Regiment Hauber.

"Of course. But I—"

"What were you going to say, Mr. Corday?" said Jocelyn. "Go on and tell the gentlemen."

Alan bit his lip. His wits were for a moment frozen by Jocelyn's presence and then suddenly they whirled with answers. There was a very faint mockery in Alan's voice when he replied. "I am certain that these gentlemen would find Johnny's Landing a splendid place, sir. The very best sort of place. But perhaps the captain will not be so agreeable when he learns something I have just discovered."

Alan put down the bit of ore and the handbook. "You can ask these gentlemen about cataphan, sir. It has displaced everything, uranium, coal, oil, thermalon—" He urged it into Jocelyn's hand. "And it is worth two thousand dollars an ounce."

Jocelyn looked up from the ore, eyes narrowing as he studied Alan, and then he thumbed at the handbook. Alan smiled at the old man and his friends. He had liked them on sight—sincere, quixotic with idealism, trusting the whole Universe and bound outwards on colonization which in itself said much. Most colonists were convicts, political refugees, defeated nationals or the eugenic outcasts. Once in a very long time such a man as Regiment Hauber and his friends undertook the gamble of outer space. Earth had neither encouragement nor discouragement to offer. Occasionally she exported unwanted to the stars—once, sometime back she had loaded up the remaining half of a defeated Venusian rebel navy and had sent them outward bound. Alan had met one of the ships on No. 5 Sun<sup>10</sup>, the vessel now in the trade of the long passage. It was this gesture of contempt on the part of Earth which brought to him how little Earth had to fear from colonies.

Regiment Hauber might or might not know the truth about other systems. But a colony, laid down anywhere out there, could not expect intelligence of its whereabouts to return for generations. News would not circulate widely in the vessels of the long passage for more than a handful of millenniums. No other ships would stop unless the planet was rich. It was abandonment complete and isolation utter, a somewhat frightening prospect even to a brave man.

Earth did not care to plant colonies since there was no short term advantage. But so far it had not objected in the least to colonies being planted. Predicating their philosophy on a continued advance of Earth culture, the succeeding governments on Earth knew that nothing was to be feared from an attack from outer space. Many hostile and even terrible races had been discovered out amongst the stars but none with enough technology to conquer or attempt to conquer space. Further, any attack on Earth by a colony in the stars using Earth culture would find itself hundreds of years, perhaps, behind Earth culture in terms of weapons and ships. Taking the latest with him, Regiment Hauber would be thirty years behind technology on Earth the instant he landed on Johnny's Landing. Even an already founded colony, taking the latest technical information from some ship on the long passage, could not build up an effective offensive force which would compete with Earth. And an attacker from some star would have to compose itself of soldiers very desperate indeed to leave their homes forever behind them—for any force from any star would not return home in time to resume course with their peoples.

Earth, then, did not object to any such activity. It cared little about the long passage. It cared not at all about Regiment Haubers and their optimistic people. The drain on Earth population in this manner

was minute but welcome, Earth, as Alan had discovered that morning, now numbering its peoples at ten for every arable acre, about one hundred sixty percent of what current agriculture could provide.

But there were few volunteers for the long passage. At least few who had the money to go and the desperation to attempt it, for desperation is no handmaid of cash.

"I trust you will have good equipment, sir," said Alan, to break the silence of Jocelyn's study.

Hauber smiled benignly. "We have the very best, Mr. Corday. The very best. But of course we'll need the advice of old hands such as yourselves and we'll follow your advices. You know what it is like out there. We don't."

Jocelyn looked up alertly. "I recall the place you have in mind, Mr. Corday. I recall it very well. And I recall the mountain. It was undoubtedly this ore in contact with silica at the base. Thank you for your interest in the matter."

Alan started to smile; for once he had got the edge on Jocelyn. But he checked the smile with the realization that Jocelyn never thanked anybody for anything unless he had something else in mind.

"Very instructive," Jocelyn continued. "But if the Pluto deposit is so small I don't doubt but what they'll have had to find a newer fuel by the time we returned. Mr. Corday is rather young, gentlemen. Excuse his bursting in here with this bric-a-brac. You may leave,

Mr. Corday. And if you find any new marvels, pray don't fail to report them. Don't fail."

Alan gave him a glare of pure hate and quickly about-faced. As he left the room he heard the smooth voice of Jocelyn saying, "Now, gentlemen, about this venture. We can take five hundred, if you don't mind crowding. We're having new air supplies installed of a very late pattern and, after all, it's only a few weeks. But I would advise you to cut your number in favor of freight. Three hundred women, one hundred men. It happens that I know of a cache on Johnny's Landing which might be useful, but freight, after all, is the important item. Besides, at ten thousand tylers the passenger—"

Snoozer was still at the air lock. Alan scarcely saw her, such was his bitterness over this venture. Ten thousand tylers the passenger. And a high bill for freight. And half a dozen of the best young men shipped forever and the prettiest women detained and a colony planted where a colony had suddenly perished before—

"Are you going to hit dirt?" said Snoozer. "I have six of these funny tylers to—"

"The man's a devil," said Alan with heat. "A devil! A devil!" And he walked angrily down the gangway and out of sight while Snoozer, drooping, her new scarf not so pretty to her now, looked after him through misting eyes.

#### XIV.

*"Behold the funny passenger  
Afloat in thinnest air  
Missing on all gravities  
His coffee in his hair . . .*

Ye gods," finished Queen, "I'll be happy when we can get this ship cleaned out."

Alan looked at her across the wardroom table with a shudder of distaste. She put down the tray of bottles she had brought up from Marby's greasy lair and smoothed her dyed hair.

Swiftly laughed and reached for his quart. "Good sport the women though, what?" he said.

"You young dog, you," said Queen. "Your own people not good enough for you. When are you going to take up regular, dearie? My shoes have been outside my door for years."

"The only thing which keeps me back," said Swiftly, "is a frightful respect of that bally knife old Marby carries, dear. Tiri-liri-tura-lu, first one today."

"First bottle, you mean," said Queen. "Well, I'll have to carry on the picture of unrequited love, honey. Here are your cigarettes, Mr. Corday."

He broke the seal on the pack and selected one. They were getting hard to come by. Nobody in the Solar System, it seemed, had smoked them for centuries. He scribbled his name on the chit and handed it back.

Queen took it coolly, lifted the

tray and with a rumple through Swiftly's hair, departed.

It was a little gesture. Alan listened to her receding beelbeats. Suddenly, as she had smiled at Swiftly, Alan knew how very lonely he was. He had neither liking nor respect for Queen, for her brawls with Marby, for her native unscrubbedness—for even after he had installed the re-use system for water a couple of trips ago, making unlimited water available, Queen, too long in space, had stayed unwashed. He winced at her bawdy jokes and at her familiarities with everyone from apprentice spaceman to Hale. But, he had realized abruptly, she was still part of the ship, part of his country. And like his country and his ship she now ignored him.

He lighted the precious smoke and found it had no flavor. He looked at Swiftly, lounging at the foot of the table, soaking up coffee royal in a moment stolen from the bridge with Jocelyn, for once, on his proper watch. Swiftly was good-hearted to everyone and yet even Swiftly seemed distant to him.

"Swiftly," he said suddenly, meaning to go on and ask his question.

"Eh?"

"Nothing."

"Oh."

Alan twisted around uncomfortably and looked the other way. He knew he had a lot of things to overcome. He had a manner which had been born into him—abrupt, aloof as became a tenth class. He knew he had a lot of failings in his asso-

ciation with his fellow man. It was not easy to be here, in this variegated company, and have no single intimate. Couldn't he forget he was a tenth class? Maybe that was what was wrong with him. A tenth class — But where was the tenth class now? Not any on Earth but the most learnedly profound professor of ancient history knew what a tenth class had been now. How did a man shed his background. Could he do so?

Strange, ingratiating to all, even Alan, had said something one night about wiping out experience from the mind. Strange had claimed that an ancient work he had seen in his youth gave forth a method which would eradicate even loyalty from the mind. If he could just forget — But he shuddered at the vision of some of the crew, empty-eyed people on whom Strange had worked. He turned back and was about to ask Swifty what the crew thought of him when his cigarettes, which had been floating upwards from ungravity fell with a crash into his empty coffee cup. He started up, as the whole crew always did with a change in the vessel and then sank back.

"Check blasting for a land, what?" said Swifty. "Thirty watches we'll be in and then, heigh-ho, to work we go. That young Bill the Eye will do the work though. Jolly good joke. He's so crazy about piloting he hasn't found out yet what hard work it is."

This interested Alan. "Who gave

you authority? Why, he's just a child. Twelve, isn't he?"

"Fine pilot. Bit reckless though. Buzzed a parade last look-see on Earth. Had to bat him to make him stop. Born flyboy."

"You mean he's got whole control? Swifty, Bill isn't big enough to see out of a cockpit."

"Got to start 'em sometime," said Swifty.

"But the plane. That's the only one we've got!"

Swifty sat up. "Oh, bosh, Corday. Come off it and try to live like us mortals." And Swifty, good-natured Swifty, took up his bottle and left the wardroom without a backward glance.

Alan glared at the pilot's back and then, after a moment, slumped, staring with hurt eyes into his empty cup.

Snoozer, big-eyed, clean scrubbed hesitated outside the door. Then she rapped with a burst of courage. "Cap'n compliments, Mr. Corday, and he wants a navigational check."

Alan rose and walked past her to the ladder which led down to the bridge.

"You forgot your cigarettes, Mr. Corday," said Snoozer, snatching them up.

He took them and went on.

## XV.

Johnny's Landing presented a slightly altered aspect. It was speckled with farms and cities, laked with artificial dams and netted

with something Alan recognized as ancient power lines. This, to the *Hound*, sudden change was extremely disagreeable to Jocelyn.

On his bridge, binoculars clenched in a savage hand, Jocelyn's face was bone-white with hatred. It startled Alan that the pleasant prospect of the domed little cities which stretched out of the hilltop on which they had landed could so affect the captain. And then Alan took down his own binoculars from the rack and inspected for himself.

The hill on which they stood was some five hundred feet above the plain. And the bridge of the *Hound* reared three hundred and eighty feet above her tail so that the view was very fine.

But in three seconds of looking with his binoculars at fifty power, Alan saw, though with much less emotion, what Jocelyn had beheld. There was a small army, headed by half a dozen tanks and followed by artillery, coming up the road from the nearest city.

But they were not men.

"Corday!" snapped Jocelyn, strained white with ferocity, "take a party of twenty with hand weapons and attack!"

Alan stared for an instant at Jocelyn and then looked back at the horde. It must number half a thousand with reinforcements running in across fields. Then he saw the antiquity of the weapons.

"Aye, aye, sir," he said. And five minutes later he was going

down the hill to a defile in the rocks a mile and a half from the ship, twenty crewmen at his back and Bill the Eye skipping along beside him in a high quiver of excitement, elated and crowing at having been grabbed up as a messenger.

"Seen 'em when I was about five," said Bill, tow hair standing straight up. "The Earth colony here used 'em as slaves. Then they all died off from something. But you was here when we landed the last time. Guess in the thousands of years since I was ten they sprung out of some place again."

Alan was appraising the oncoming forces. He swept his men into double-time and threw them into position on either side of the road in the defile, ready with an enfilade hand fire when the range was two miles.

"Old Jocelyn's death on these sentient races," chattered Bill. "Seen him burn down five hundred thousand Gleenites oncet. Burned 'em clean off Majority Capella. That was before your time. You got any chewin' gum?"

Watching that crawling snake of an army, Alan shuddered a little. It was a chilly thing. These "people" had no features or eyes that he could see through his glass. Then he shifted to their nearest town and then to a power line. Strange but those things were quite different from anything he had ever seen in the ancient histories of Earth. With sudden amazement he shifted back



to the oncoming army. The things could evolve a society that included finite physics. And then a slight chill hit him. If they could get this far, they could some day throw ships into the long passage. And that army showed they had no slightest use for man.

"You goin' to pile 'em up all at once?" said Bill. "Or pick 'em off at long range?"

Alan ignored him. He took a pocket ranger out and sighted in a far white boulder at one and a quarter miles. He passed the data along to his tensely waiting spacemen.

On came the brown snake through the dust. The leading tanks breasted the white boulder. Eyes were on Alan's hand as he raised it. On came the snake, swelling as things wriggled over walls and dropped into the road to march on with it.

Half the snake passed the white boulder. With a short, vicious chop, Alan brought down his arm. The defile crackled, the air ionized, the daylight went dim.

There was a shudder in the center of the snake. And the air crackled on. Dust, and smoke from ignited pavement curled upwards, speared lazily into the sky and obscured the slaughter. The pall grew dense, grew black, grew inner-lit with red tonguing flames. The valley was full of stench and smoke.

And then, suddenly, a hundred yards to their front emerged from out the rolling clouds, three tanks. Tubes from them were bucking and

leaping and spitting scarlet. Rock splinters flew upward before Alan's face and he fell back, stunned. The spacemen, firing still at range given, wildly readjusted their hand weapons. And a tank churned in amongst them.

There was a crash from the ship as its forward battery fired, rending the air overhead into green tatters. Bill the Eye snatched at Alan's side-arm, threw over its catch and just as the tank turned to depress its muzzles, Bill shot.

There was an explosive boil of molten metal and fragments of a blazing thing. Bill fired again for good measure.

Two hours later Alan, wearing a bandage, stood to on the quiet bridge, waiting for Jocelyn. Alan knew what he was going to be told. He had erred in not picking off the armor in the van and in forgetting it could come forward at high speed under the cover of the smoke and dust. He had had one crewman killed because of it. And he had been rescued by young Bill the Eye, a messenger.

Jocelyn had been down conferring with Regiment Hauber as they disembarked to take possession of a countryside which was a going concern—if potentially depopulated by Swifty's quick flight with virus over the towns of these hideous things.

At last Jocelyn came up on the bridge. Alan stiffened. After the first glance Jocelyn walked away and went into his cabin.

## XVI.

It had been a long and tiring voyage and they all showed the strain. The old *Hound of Heaven* was incapacitated in part by the accumulated breakdowns of a trip which had taken a year and which had not touched any place where adequate supplies or fuel could be had.

From Johnny's Landing to Paradise Alcor, from Paradise Alcor to Sweeney Merak, from Sweeney Merak to Coppaccine Dubhe and Coppaccine Dubhe to Earth, or as the pilot had it, to Earth Sun. It was a route known on the long passage as the Big Bear Circuit, touching as it did the main colonies of the constellation Ursus Major alias the Dipper. And things had not been well on Coppaccine Dubhe where on previous trips there had been spare parts. And so it was with something like relief that they entered the outer atmosphere and let Swifty go.

They waited for him with optimism, the women talking of what they would buy, the crewmen happy at the prospect of better food and guns and replacements to ease the strain of watches. But that changed when Swifty came back and the rumor fled through the ship: Earth had been at war. But the war was done and had been done for several hundred years.

Jocelyn drifted down toward their old spaceport and one-time New Chicago. And from the ports, black so long with space dark, a haunted

crew looked down on grassy mounds where cattle grazed and at a plain where a drowsy river ran.

And Jocelyn looked at the scribbled scrawl of Swifty's report, squared his shoulders and began to con. They came in two hours above an area which Alan had once known as Colorado and where now stood a sprawling, irregular city some hundreds of miles in extent.

The tired crew and the battered ship eased down, for a spaceport lay below. It was a strange sort of port, but it had a spaceship on it, like a shaft of alabaster. And Jocelyn jockeyed the *Hound of Heaven* down beside it. A rough landing, on the last ounce of her take-off fuel.

The space locks clanged open and sunlight and air rushed in. The crew stood by, ready for word from the bridge to "hit dirt." But the word did not come.

Jocelyn looked at the gates of the port and saw that they were metal gated. He swept a glass around the area from the vantage height of the bridge. It was all inclosed.

And there was not a single human being in sight.

Jocelyn coughed. He looked tired. Since his exposure on a planet, deceptively inviting but poisonous with beryllium oxide, he had not been well. And the rumor had crept quietly through the ship that Strange had said he might die, victim of a loose valve in a space helmet. He pressed a silken handker-

chief to his lips, coughed again and turned to Hale.

"What do you make of it?"

"Maybe the whistle just blew," said Hale.

"Corday," said Jocelyn, "step over to that other ship and find out what they know about this place."

Alan saluted and fled down the

ladders to the ground air locks. He stepped out into the sunlight, started to take a deep breath and then was struck with a curious foreboding which wiped away all his exultation



of being on Earth again. It was so still.

He rapidly covered the distance to the other ship, reading off her name before he swung up her gangway. She was the *First Fairway* of Mars.

"Hello the officer!" he hailed formally.

His voice made a curious echo in the vessel and something made him clutch his sidearm as he stepped through the port.

But she was empty.

He stepped further in, alert. But she was not only empty of men, she was empty of equipment as well. He glanced upwards and found himself looking five hundred feet to her bow ports down which came two eerie shafts of sunlight to dimly light the interior of this hulk. She was without men, without equipment, without decks. Just a hulk.

Alan sped back to the *Hound* and reported tersely.

"Hale," said Jocelyn, "take fifteen men and test the gates. If they are locked, make no overt move but call any human you may see and demand freedom of the port."

Hale grinned. He pulled down a battle helmet, huge as a caldron, buckled a brace of sidearms around his ample middle, stuck a cigar in his face and lighted it. Alan was struck by Hale's exaggerated casualness, by the strangeness of his smile.

"So long, skipper," said Hale. "Keep your pointers up, Corday." And he dropped down the ladder and was gone.

After a little while they saw him muster his volunteers and fan them out. And then Hale marched across the wide plain of the port to the main gates, his people spread far on each side of him, his weapons in hand.

The party grew small in the distance. The fan contracted a trifle as it neared the main portals. Jocelyn stifled a cough and gave a warning to the bridge deck gunner to look sharp.

But there was no chance of the gunner coming to bear.

With a suddenness which meant long planning and great practice, with a blaze which meant enormous ability in explosives, the ground tore asunder under the party's very feet. And through the gates came long tongues of brilliant orange.

The smoke was heavy but out ahead of it burst Hale, waving his arm to his men to come on. Three struggled up and sought to follow that roaring war cry. And then the gates flamed again, struck out and struck down. Hale stopped. He turned around, staggering, torn almost in half. He fixed his eyes on the ship and half-lifted his huge arm. And then once more the gates blazed forth and Hale fell heavily to Earth, the last of his party to die.

Alan turned, on the verge of raging fury, ready to kill the bridge gunner where he sat. But reason tugged him and he knew that Hale's closeness to those gates would not

admit such a thorough blast as the bridge guns would have made.

The icily emotionless voice of Jocelyn sawed through the stillness of the place. "Turner, load smoke. Fire smoke. Snoozer, pass the word. Smoke."

And the bridge gun snarled as it hurled out charge after charge, bucking and reeling with recoil and elsewhere in the ship other guns roared into a thundering chorus.

And then they stopped.

An area of ten square miles was blanketed thick with drifting but impenetrable smoke.

"Fire on image!" snapped Jocelyn.

The bridge gunner flicked the switch on his memory plate and began to chop bursts at the gate, now everywhere invisible except in his sights.

"Saturate with G19," said Jocelyn. And Snoozer spoke into the ship circuits. "Seal the ship!" said Jocelyn.

A moment later the multiple batteries made the hull shake as they hurled charges out into the smoke which, at least in other days, had foiled detectors which might search for the *Hound*.

"Saturate with RG," said Jocelyn.

"Saturate with RG!" said Snoozer.

And the batteries on other decks vibrated as they hurled forth regurgitant gas to cling to the particles of smoke.

She had been used as a merchant vessel. They might have better

ashore. She was old and tired and her technology had been theirs uncounted centuries ago. But she fired and sought to defend herself. And the Deuce stared with anger at the empty tubes where there was no take-off fuel.

Alan had already taken down his helmet and was looking to his gun.

"Battle party stand by the starboard ground lock in full space kit," said Jocelyn.

"Battle party stand by the starboard ground lock in full space kit," repeated Snoozer.

Alan turned alertly to Jocelyn. There had been other battles in the outposts in the stars. And the command of the second battle part would devolve on the remaining mate.

"Where do you think you are going, Mr. Corday?" said Jocelyn, taking his own suit from the hands of Mistress Luck. His spacesuit rustled as he put it on. He fixed the helmet in place, tapped at the voice multiplying switch at his collar to nul it for a moment.

Alan sagged as he recognized in this the contempt Jocelyn had always shown him.

"Mr. Corday, I leave you in charge of the vessel. Regardless of what happens to me, you will not quit the ship with her remaining crew but will do all in your power to defend her at her own ports. You are sufficiently informed of these things to sell her not inexpensively should I fail." He took to coughing and the eyes of Mistress Luck

were round with concern. He cleared his throat then and continued. "You are young and impulsive and have many faults to overcome. Let no quixotic stupidity lead you to risk this vessel and the women, children and crew which remain within her unless you have clear and unavoidable cause. I will be back, I am sure. Remember that," he added harshly.

Pegging his helmet again, Alan turned away. Behind him he heard Mistress Luck adjusting buckles on Jocelyn's spacesuit. It was a bitter thing to be so shunted aside. An empty thing, "in charge", for in the absence of all seniors, he had been "in charge" many times before. A tradition. No more. He was obviously not considered trustworthy enough for this task. And yet, twice since Johnny's Landing he had proved himself and proved himself well in the field.

There was a rumble somewhere below as landing force equipment was rolled out. Ancient equipment but it worked and it might serve. Alan knew what Jocelyn would do—blast through an unexpected point, take the besiegers in the rear, detach a small party to scoop up important officials or officers in a swoop raid while all the fireworks and purpose seemed to be directed elsewhere; and they would hold the hostages against supplies. Long passage practice, time worn and usually successful.

"Sir," said Irma, the bridge talker on the landing evolution, "can I run down for a minute and tell Joe good-by."

"Stand by your post!" said Alan. And he hurled his sidearm back into its holster.

A moment later he was sorry. There would be people killed in that landing party. And he almost relented but stopped in the act of turning and walked forward to the bridge gun which was manned. The memory plate still gleamed with the image of the gate but the gate was certainly no longer there. He faced the detectors. The operator was gone, member of the first landing party, dead now. His replacement had left with Jocelyn. But Alan had installed these things new, last trip in.

He polarized the beams until they righted a path through the swirling density of smoke which now completely obscured the ports, even coated them. Then he sought to tune to get an image. But the protective barrage was too good. There was not even a faint blur on the screens.

Nervously he went over to the communicator ledge. It was ringed with the marks of Swifty's countless bottles and he recalled Swifty.

"Pass the word for Swifty," he told Snoozer. "I want him to count noses still aboard."

Snoozer slid away down a ladder.

Alan was listening intently for any firing outside. It would be hard

to hear through this sealed and insulated shell but it would not be impossible. But he heard no firing. The smoke and its components had gulped up the second landing party and every sight and sound.

Swiftly gangled up the ladder. "Got it, Corday. We're trimmed down to five old men, forty engineers and technicians, sixty-eight women, thirty-one kids and thee and me. But I think some of the kids are a bit too young to man a gun. Little chappie back there said, 'Glug, glug' when I wanted to know his proper emergency station. Had a mouthful of milk."

"Break open the storage arsenals and serve out weapons," said Alan. "Pass the word all hands in masks and full battle kit, gamma-proof spacesuits. That means *all hands*. That smoke is deadly."

"That isn't all that may get deadly around here, eh? Well, get me a short drink and hobble on my way. But they'll make short work of us, you know, when they begin to feel for us with high-powered stuff."

"The smoke is heated and their detectors won't locate us unless they've got telepathy machines!" snapped Alan. "And they want this ship for what they can salvage out of her. The other was gutted. They won't shoot this way! Don't spread any sad conversation about it."

Swiftly shrugged, poured himself a small shot, downed it and gangled below.

Nervously Alan tuned his ears for the sound of firing. There had not

been any yet, so far as he could tell. He felt left out of it. The safest post in the whole fight was here. Jocelyn hadn't trusted him enough. But the emergency was great and they were lost entirely if the second landing force failed.

There had been very little wind, the screen would take a long time to dissipate. But he wondered if he might not be wise to create a diversion by hanging away into the town at long range. But no, that would bring the attackers here into the desperate necessity of destroying the ship. He would wait it out.

"Post a man outside," he said to the returned Swiftly. "I want him to use his ears. Maybe we can tell. Give him a phone."

"Won't that spot us, old boy?"

"That happens to be the least of our worries," said Alan. "Post the man."

"If you say so," shrugged Swiftly and gangled off on the errand.

Alan worriedly twisted at his scarf, realized what he was doing and hurriedly stopped. Waiting was hard.

## XVII.

To allay his increasing nervousness Alan concentrated his mind on the possibility of take-off. But there was no answer there. A ship which used particle drive had to use non-radiant fuel for maneuvering close to ground. And while they had enough high drive to take them back to the stars—having wisely provided

against that sometime day when Earth would no longer be able to furnish fuels from herself and sister planets—their alpha supply was done. Even their last landing had almost knocked them apart from conserving the last dyne. To take-off on high was unthinkable. Touching off their main power this close to Earth would, with zero initial velocity, simply blow them to pieces to say nothing of cutting the Earth crust to a depth of forty miles or more and drowning the tiny fragments of ship and man in lava.

He now and then called for a report from his lookout. Firing had crackled sporadically toward the town for some minutes now but it was impossible to judge what might be happening beyond the certain knowledge that Jocelyn had made hot contact with something.

It made Alan fume to be standing here, idle, trapped and to think of his fellow shipmen out there waging war with high odds. If Jocelyn lost—

The ship knew much of what would happen and might be able to guess the rest. If this city merely took the survivors prisoner, the people of the *Hound* were still lost for their ship would be lost and they, all of them, were millenniums out of phase.

At last Alan sent a messenger groping out toward the firing. The boy did not go far before he returned along the string he had laid, leading a wounded member of Jocelyn's party.

The man was dreadfully ill, his spacesuit opened by some scorching missile, his right arm burned nearly off, his lungs full of RG and smoke. Alan came down the ladders with a rush to the sick bay where they had taken him. It was the detector technician.

Strange and his assistant were stopping the arterial bleeding when Alan came in.

"Get a motor on him and pump out his lungs!" said Alan. "I've got to talk to him."

"Pretty terrible shape," said Strange. "Better let me give him some nerve drain."

"No," said Alan. "He's got to talk. The data he has is more important."

"It might kill him."

"Not knowing might kill this ship!" said Alan. "Do what I tell you!"

Strange sighed and pulled out the tubes of the device they used when suits leaked on planets with poisonous air. He attached it and in a short while, beginning to writhe under the stimulus of an awakening shot, the technician was ready to talk.

Under Alan's insistent hammering he finally answered: "Lost . . . the party into . . . town. I . . . was one of them. Skipper pinned down . . . thousand men . . . no uniforms . . . got funny weapons—"

"Put him to sleep," said Alan.

He pounded a fist into his palm again and again as he went up the ladders, scowling and racked. Sud-



denly he turned and went back, bypassing the sick bay and diving into the engineering compartment.

The Deuce was there, ears strained to the distant firing, heard faintly through the hull.

"Get your tools. All the men you've got, full kit and follow me!"

"What's up?" said the Deuce.

"Jocelyn is held up, probably superior weapons against him. We've got to work fast."

"Reinforcements?" said the Deuce.

"Follow me!" said Alan.

Snoozer was just behind him. He had not noticed before how close she had stuck. "Pass the word, all hands full space kit, outside."

She darted off and in a short time Alan stood beside the after lock watching the ghostly shapes of the crew assembling in the swirls of smoke outside. There were not many left. Most of them women, some of them carrying babies, all of them carrying weapons.

"Thought we were to stay—" began Swiftly.

"Deuce," said Alan. "Take your people aft. Call anyone else you'll need for work or transport. Dis-mount a high drive and its load."

"Do what?" said Deuce, a thin shadow in the smoke.

"Do as you're told," said Alan.

Deuce, puzzled, called off several names and vanished. Alan withdrew the rest from the vicinity of the ship after checking that none were now aboard but two sick and the assistant to care for them.

Alan posted Bill the Eye with a pack communicator near the ship and gave the equipment mate of it to Irma, already burdened with a two-year old.

"You stand by," said Alan to Bill. "Jocelyn or any survivors come back, route them compass north and up the east side of the hill above here. You saw it coming in? The town lies mainly west. Bad terrain east of it. Tell anyone to come up the east slope to the crest and under no circumstances to approach the hill from the west or they may get shot."

"Sure," said Bill.

Alan fumbled through the smoke to the engineers working on the drive and gave them the benefit of his shoulder. They had it dismounted in seven minutes, long practiced from changing drives in full flight. And they wrapped ropes around it so that it could be carried.

With a final check on Bill, Alan led off by compass. Half his party were engaged with the drive's transport, the remainder were spread out as flankers and rearguard. Alan and two engineers with disintegrating torches led the van.

"How yer know we can climb that hill?" panted the Deuce behind Alan. "And how do yer know if it's even there?"

"Anyone trained in surveying notices topography," said Alan. "And compass directions. Pass the word now to be as quiet as possible and keep close."

When they reached the metal fence to the north, almost colliding with it in the dense smoke, Alan let go with the torches and burned out a hundred foot section. He threw a scouting party through this and then called up his main body.

They passed through a dimly seen residential area and trod twice on unmasked men in agonies of vomiting in the street, a sight which greatly cheered them all.

Pressing on through the smoke they came to rising ground. It was steep and here everyone had to lend a hand on the ropes. The drive, usually handled by cranes or in the ungravity of cruising, did not offer an easy problem in this precipitous ascent.

So engrossed were they and so heavy was the smoke that they came solidly into a blockhouse, point-blank. Swiftly, in the van, fired fast and heaved a grenade in at the door. Unmolested they went on up.

Blowing and wheezing they came at length to the hogback of the ridge and began to ease the drive down.

"If I knew what you were doing—" complained the Deuce.

"Bear a hand," said Alan.

Two hundred feet, down they came to a hillside home, built here as some rich man's whim, clinging to the perpendicular but commanding a view. A track went down from it, a private railway.

Two servants were present, clawing in exhausted misery at the boards of the sun porch. Alan crisply ordered a spare mask to be

put on the man. He gave no second thought to the woman.

Thrusting pack spades deep into the formal garden they butted in the drive, angling up its nose until Alan was satisfied. People not intimate with the engineering department were happy to get away from it, suspicious of its radioactiveness and none too confident of the ability of their spacesuits to prevent burns and none too confident of Strange's serum against gamma rays with which they all were customarily shot when it was put this near to a test.

With the others retired, Alan and the Deuce installed a throttle and an igniter and the engine was ready to do its customary duty in an unaccustomed setting.

Alan went into the house and attempted to question the man servant but the fellow was too terrified to talk and when shot with a catalyst was too exhausted to do anything more than sleep. Disgusted at the balk of his needs, Alan ranged the place, looking for the phone. He passed it several times without seeing what it was, for he had supposed that the wall screen was video. Then he found what he wanted, an index book of the city. The town, he found, squinting through face-plate and smoke at the strange script, seemed to be known as St. Denniston and the main exchange was Denver. Then he sighed with relief and gave himself a little more air to clear his thoughts and perceptions.

In the back of the book was a map of exchanges for the purpose of long

distance and after that was another map of the central section. It was difficult to read the printing but, by checking against the index itself he found what he wanted to know. They had landed at the capital city of the "Third Estate" and from the frequency in the book of the name "Consoundalin" he concluded that it was the individual in power. He cross-checked what he had found with a basket full of tape which proved to be a newspaper and discovered he was right. He tore a page from the book and went back to the drive.

There was a little more shifting and then Alan sent all of his party up the hill and over the crest. Keeping the Deuce and Snoozer with him he unreeling throttle wire down the slope and to the right until they found another residence, a quarter of a mile from the first.

Here were other servants, all ill, all too deep in their own exhaustion to be interested. No "upper class" was in the house but there was a big wall screen there. The Deuce fumbled with it for a while and at length discovered that by sitting down on the seat beside it, it lighted.

A girl glowed into three-dimensional being on the screen, a pretty girl, white, without much on.

"Give me Command 1," said Alan.

She frowned, trying to understand what he meant, and then asked for a repeat.

"Huh!" said the Deuce. "If that's

the language now, I'm glad I'm on the long passage!"

Alan held up the torn index, pointing to the number. The screen blurred, showed a pretty picture during the wait and then flashed on as an office. Both the exchange and this office were obviously beyond any smoke pall the old *Hound* could hope to throw. There was a grand unconcern on the military aide's debonair face when he looked up and spoke.

"This is the *Hound of Heaven*," said Alan. "Sec . . . first mate Corday speaking."

"Eh?" said the aide after the fashion of aides speaking to inferiors. "Eh?"

Alan was talking lingua spacia and the aide finally grasped the fact, grasped it with some surprise. He stood up and called to another office and a man in a naval uniform entered, the naval aide.

"This is the *Hound of Heaven*," said Alan.

"Really?" said the naval aide. "And what would that be?"

"A ship from the long passage," said Alan.

The aide tensed and then relaxed with a smile. "Didn't know you had a phone, you know. Interesting hook-in, isn't it? Understand you're in a trifle of a jam. Might tell me what your cargo is. The old man is interested in cargoes since the embargo."

"I don't think you'll particularly care about our cargo," said Alan.

"The way you are trying to buy it, it will come too high."

"You mean the fellows at the port," said the aide. "I suppose you've been gone two or three years and won't realize that it's criminal to land. Forfeit all your cargo to land. You're calling to surrender, of course."

"I'm calling to give you five minutes to call off your pups," said Alan.

"Oh?"

"For if you don't, you aren't going to have a town."

"Oh, really?" said the naval aide with the smile aides manage in talking to inferiors.

"I hesitate to give you proof," said Alan. "It will cost you several thousand citizens."

"I assure you," said the naval aide, "that the relief of such a number of populace would be a god-send."

"Even if it includes yourself?"

"What a bluff. Well, I respect you for it. Now if you want to surrender, we'll give you safe conduct out of the spaceport—"

"If you don't surrender this town to me in two minutes, you're going to get a full load, straight from our bows!"

"Really—"

"Really! I withdraw the two minutes. I'll fire one burst and be back. In ten bursts there'll be no St. Denniston."

"Deeniston," said the naval aide. "I—"

Alan pulled the Deuce off the switch. They unreeled the line into the basement, braced themselves against the wall nearest the drive a quarter of a mile away and closed the switch.

The ground rumbled.

Alan opened the switch.

They waited for a few seconds and then, checking their suits, went back to the first floor. One wall of the house was blown in but the phone worked.

"Command 1," said Alan, pointing to the torn index page.

The girl was shaking, sticking to her post but glancing back of her, unable to concentrate fully.

"Command I—"

No pretty picture this time. The girl put in her plug and collapsed across the board.

The naval aide was still there but the office had changed. Pictures had fallen from the walls and there was a fog of dust which, combined with the smoke in the room where Alan stood, made the image wavy.

Before the naval aide could speak a towering man rushed in, falling over the skirts of a golden robe. He was shouting unintelligible things.

"If that is Consoundalin," said Alan in lingua spacia, "tell him he's a hostage." He held up the switch, close to the screen so that the aide could see it, so that Consoundalin could see it. "When I press this again, another blast begins. I don't know what you know of this but it's high drive. Another blast to an-

other quarter of town will double your casualties. Do you surrender?"

There was a gibbering conference interrupted by cross phone connections which screamed about damage.

"I guarantee your health," said Alan. "You and your boss, mister. But if you don't deliver yourselves at the gates of the port in five minutes and if you don't call off all hostilities this instant, another blast starts."

Consoundalin pushed a purpling face at his screen when he heard this translated. Then, suddenly, he sagged and reached for a switch to connect him with his looting parties.

Alan left the Deuce with switch in hand, sent Snoozzer to recall his party and, with a sporting weapon he had snatched from the walls of the home, raced down the slope for the spaceport.

### XVIII.

The smoke was clearing down. There was no firing. But through the thinning haze the *Hound* could be seen. And there were strange soldiers about her and a hole in her midships where artillery had ranged her.

Alan cared little for that. He was looking wildly along the buildings to find any remnant of the ship party. Then in a street outside the port he saw piles of uniformed bodies, nearly a regiment, and saw that they faced a thick-walled building which had been used as an op-

erations office when the port was active.

He saw a group of men lying on their arms, also facing the building, and knew that at least some were left alive inside. Knowing this he ran back to the gate and arrived there as a huge globular shape skidded to a halt. Out of it climbed the naval aide, three other gentlemen and Consoundalin. Alan wasted no time.

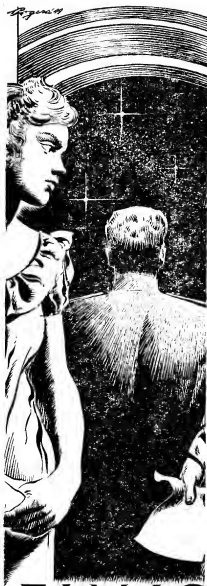
Suddenly hot with anger, he gestured that the vehicle be sent away, and it went. Then he indicated that he wanted all troops withdrawn from the area and in a short time the naval aide came back to report that they had gone. Alan saw them marching up a street and he turned, white lipped and shaking to Consoundalin.

"I don't know how you came to power or what devil's society you govern, but you are a disgrace to mankind. Don't bother translating that," said Alan to the aide. "Order them to disrobe."

There was protest at this but not for long. These men had just driven through streets clogged with dead, had plowed their way through panicked mobs, had passed over the ruin of buildings with their dying still inside.

Alan waved them to a wall. "You are my hostages. If I get everything I require here, you will be restored and go free. If I do not, you will die. That is simple. Carrying it out will be simpler yet."

Consoundalin snarled something



# FINIS

and the naval aide said, "He says you're a demon. A moment before you called we had the ship in there under attack. It is not fair. You were not firing from your ship! The switchboard girl died and we had no way to trace where you were. What brimstone work is this?"

"Something hotter than brimstone!" said Alan. He found himself aching to kill these men for the damage they had done, for the people they had shot down—and all for the loot of a cargo. Swifty came.

"Guard these people. Take them into the ship and put irons on them and post them before a lower port where, night and day, they will be visible to the curious who want to know if they are still alive. I think this king or whatever here has instilled terror enough in them that they will fear to attack in case he goes free unscathed, for then his vengeance would hit them." He turned to Bill the Eye, scratched and bruised in resisting the ship attackers. "You heard those orders. Pass the word. These men are to remain alive as our only hope."

He was free then and he turned a contemptuous back on his prisoners and hastened to the operations office.

He hailed it from a distance. Its walls, resistant to take-off blasts, remained silent. He came nearer, keeping in plain sight, walking over the mounded dead, kicking aside strange, powerful weapons.

It was silent in the building, a silence heightened by the moaning

wounded in the street. Alan thumped the door with his pistol butt and it echoed hollowly within.

He waited, feeling the oppression of the place as though he stood before a tomb. He tried the lock and then stood back to look at the structure. He walked quickly around it and to the back. There was a blank wall here except for a single door. It was ajar and Alan pushed at it.

The place was carnage.

The dead were racked along the wall, each one at a post. The wounded had dragged themselves to the center of the room to die. And before a window slit, through which still pointed his outmoded blaster lay Captain Jocelyn, his face serene in death.

Alan took another lagging step into the dimness and then saw what obscured the bloodstained white of Jocelyn's clothes. It was another who should never have been there, who had come there well after the last of the fight.

Mistress Luck lay dead across her captain's body, her small sharp knife plunged deep into her heart.

## XIX.

The ship rumbled with the energy of laboring men, townsmen and crewmen. The high, shrill crackle of torches blended with the thud of hammers and the complaint of heavily laden drills. A rack had been improvised under the Deuce's direction, ancient storehouses and plants had been ransacked for spares

and replacements. But little besides weapons was new in this society.

He had not gone near Jocelyn's cabin. They had buried their captain that morning on a knoll, his mistress and his dead beside him where the stars could look down. And the heavy sadness which had pervaded the crew was jarred with the ferocity of this work.

There had been no question about Alan, no contest of any kind. Since the moment they had known, every remaining man, women and child in the crew had given him every courtesy, first because of their soared respect for him, second because none could compare with him. And so he went now, heavily, into the cabins where once an admiral had commanded in some far off and forgotten day.

He was a little amazed to see a letter on the desk addressed to him. It was notched into the corner of a blotter and on it was scrawled, "Mr. Corday, in event of my death."

A chilly thing. It had been written weeks and weeks before this recent action according to its ship date. It had been written while Jocelyn still snarled at him and gave him contempt.

He stood where he had often stood under the captain's wrath and he opened it and read:

HOUND OF HEAVEN

Ship Year 55-1025th watch.

Alan Corday  
Sometime Noble and Surveyor-engineer  
of sometime New Chicago.  
My dear Alan:

I will not say a great deal about the

conditions under which you read this. They are very much in the hands of God, who grows, according to Dr. Strange, nearer to me than I would care to have. Suffice that you have now buried me and come here to look at my effects. They are yours, such as they are, a strange hotchpotch of vanity and memory, all that remains of Duard Henry Jocelyn, sometime captain of the Solar Guards.

Alan, I have much which pleads your forgiveness, beyond the much I have elsewhere had to do. The day you came to me in that saloon, I tricked you. I had to. And even as I spoke to Hale my hand signal said to him to take you at whatever cost. For in these many years of ranging I had not seen my successor. I picked you then.

And I broke you into an officer, Alan, with means you will despise. I ask your pardon now. A long while back, I ordered Queen to propose a mutiny. That gave you will to learn and profit by your thirst for my blood. And I commanded Strange to make you ill so that your watch count would be lost. And I built your hope for early return to Earth and kept you learning and watching how to make us come back. And then, God forgive me now, I broke your heart.

I know not what you felt, Alan, when you went into your town with the hope of ten years gone. But I can estimate your feelings. You see, Alan, it was that way I began upon the long, long passage. And my sweetheart was dead, dead a dozen years before I came back. So I have some inkling, had some even when I did that terrible thing to you.

And you came back to the ship. Two men were never out of your vicinity while you were ashore. For you had long since been appointed in my place by me. And you learned. And I gave you contempt.

You had been withheld from the particular friendship of one or another in the crew. I have caused it. Command can have no friends. As you have come to this moment, beside my desk, a lonely man and in command.

Hale could not succeed me. Many

things he does not know. Show him the accompanying note of authority and he will obey you. Show this to the crew and they, too, are at your command. But I have no idea that you will need it. They think much more of you than you suspect, Alan. It was my policy to make you believe they did not.

And now you have command. And what you will do with it is your concern. But permit me to tell you an answer to a question you have asked, asked many times, Alan. You want to know why?

You have been in many actions on many strange planets. You have seen strange things. And you have watched our Earth ebb and flow.

Earth will not live forever. And, unless he is helped, neither will man.

We could land on some fertile planet and take our ease, put aside the risks of travel, make ourselves comfortable and at home. But this ship must be our home and this task must be ours as it is the task of many another ship on the long passage.

You have seen sentient races living on our technologies or inventing their own. Do you want them to outlast our breed? Do you want those other species to inherit at last our Universe? I think not, Alan. I think you will go on.

This is the crusade of the long passage, a lonely and unthanked crusade.

Man shall triumph at last amongst the stars.

Man, not Achnoids, not Gleenites, not crawling things, can and must survive.

This ship and her sisters in the stars and on the passage are, without the slightest help from Earth, the *only* means which shall cause man to survive as a race and triumph everywhere.

Do not curse equations. Someday man will conquer Time. Until he does, Alan, you and men like you and ships like the *Hound* will bless those equations which let us go at all land with such swiftness carry on the race, the triumphs, the hope of Man.

I wish you luck in your command and luck amongst the stars, the loyalty of our



crew and the friendship of our colonies which we so strangely serve. And perhaps someday, if the priests are right, I can shake your hand, Alan, and hear from you the job you did.

God bless you.

Good luck.

I trust you. And all I had and hoped for, all are yours.

Jocelyn

Alan put it gently down and for a long while stood oblivious of the ship, his mind ranged back across the bridge of years. And then he turned and quickly walked out upon the bridge. His sight was queerly misted and it took him a little time to see the repairs in progress there.

Then he began to inspect them and gradually to put to rights the ship and the day.

In the afternoon there came a number of learned gentlemen and he gave them coldness. A reporter was with them and took down many notes so that he could publish the advantages of treating well the long passage ships.

And Alan grew cunning and told them that in the stars and amongst the colonies there were many weapons and that long passage ship, coming home even after the lapse of centuries still could lay low this society. And he told them of a means of communication in the long passage which did not exist and said he had already sent the word to other ships to be wary. And, who knew? It might help the next.

And he went into town at dusk

and looked at it and found books published after their last time on Earth. He went to a stew and he spread talk there about riches and the fabulous spaceman's life which was all gain and no work whatever. And he stood aloof while his crew inveigled men and women into signing through the night and he shipped, on the morrow, with his newspaper story out, five hundred colonists and all necessary equipment, shipped them for an "uncultivated island on Venus where food springs up from the ground overnight".

And all that day and the next he haggled for stores and books and goods, holding aloof, paying for what he got in the cargo they had brought, making it most interestingly wealthy for merchants to deal with a long passage ship and insinuating that trade was no monopoly of their monarch but the right of free-born citizens of the merchant class.

And then the ship was loaded, all repairs were made and they were done.

## XX.

Alan stood on the bridge. A military officer was bowing his way out. "You will land them from the lifeboat, then, Captain Corday."

Coldly, Alan looked at him. The man was oily. No wonder he had come so high in a debauched court. No wonder he could exist in a

society where, as Alan had seen on the day before, human meat hung in shops for sale.

"I generally keep my word," said Alan. "It would not pay just now to break it. They will be landed as and when I have said."

"Thank you, oh thank you, Captain Corday." And the man was gone.

A young engineer of the port had come into the bridge to give the instruments a last check. Alan had seen him before, a well-educated, alert young man who knew his job. Alan watched him. He was thinking of old Hale and the rest on the ridge up there, a ridge bathed in sunlight today.

There was a quiver of expectancy in the ship. The word had been passed. People were coming to their stations for take-off—short-handed just now with the new crewmen so untrained. What would those crewmen think, some of them, who did not know about the long passage and its Time?

The engineer finished with the new detecting equipment and turned to make an adjustment on the drive communicator.

Swiftly came up on the bridge to take station. He had a bottle in his hand and he put it down on the customary ledge. He was only slightly drunk. Other crewmen were here on station already, alertly watching their captain.

"Mr. Roston," said Alan coolly.

Swiftly looked up in surprise. It

had been years since he had heard his real name.

"Mr. Roston," said Alan, "I have today shipped a new atmosphere pilot and taken into the lock a new plane."

Swiftly had not known this. He stared, startled, uncertain.

"A long time ago," said Alan, "you were in a war. You were very young. You have grown older. I think it is time you forgot that war, Mr. Roston." He walked to the ledge and picked up the new bottle. He turned and threw it butt first against the bulkhead. The loud crash of it froze the bridge.

"Take your post, Mr. Roston," said Alan. "From this moment forward you are first mate of this vessel. You know your duties. Perform them. Is that clear?"

The young engineer from the port was staring at the shattered glass which had so barely missed a communicator panel. He had finished with his adjustment and now he saw how near was the ship to leaving and approached the ladder.

"A moment there," said Alan. The engineer turned. "Do you know of the long passage?"

"Good lord, sir," said the engineer, "I have a good job where I am."

"The long passage pays better," said Alan.

"And has a great deal wrong with its Time Equations," said the engineer. "Only a madman would attempt such a thing as a volunteer.

Thank you for the offer. But I have responsibilities here."

Alan looked at him appraisingly. He motioned with his hand to the quartermaster. "Take that man into custody and hold him in sick bay until we have cleared Earth."

The engineer's face hardened as he looked into the pale, tired features of Alan Corday. He rushed and the spacemen present sought to block him. But he got through.

Alan brought his pistol butt down smartly on the engineer's skull. He dropped, breathing hard, still half-conscious. He struggled half up.

"But you can't . . . you can't . . . my wife—"

They took him below.

"All stations report ready," said Alan. And waited.

"Ready, sir," said Irma.

"You will take-off and set a course for Johnny's Landing, Mr. Roston. You will set the proper watches and find a proper relief for yourself amongst our original crew. Understood?"

Mr. Roston drew himself up smartly, a piece of shattered bottle ground under his heel. "Aye, aye, captain." He faced about and began to snap the necessary orders.

The low drives trembled. The ship began to lift. The prisoners went into the lifeboat and, at ninety miles altitude, were shoved away.

Alan walked slowly into his cabin. His own pitiful collection of gear

was there in the otherwise empty drawers and lockers. He sat down in the chair before the desk, looking at nothing.

A phrase was ringing in his ears: "You can't . . . my wife—" And he saw again a night when it had rained and heard again a weirdly beautiful concerto played on a piano in a stew.

His head ached brutally and his nerves were taut. He looked at the desk. A bottle of brandy was there and a sheaf of small packets, just as Jocelyn had left them. Corday poured a drink and then, with a sudden, savage motion emptied into it the contents of a paper. He drank it down.

Behind them a city had dropped from sight, a city overlooked by a knoll, a city which had paid a terrible price for treachery.

The drink and drug began to take effect. Alan felt somebody near him and he turned. Snoozers stood at the door, face calm, waiting. She wore a pleasant dress and a new bracelet on her arm. She was no longer fourteen. She was a woman grown, a lovely woman as Alan suddenly saw. He looked at her and wondered that he had not seen before.

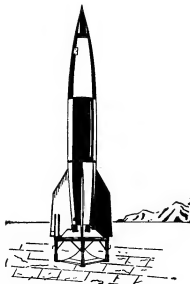
The Countess entered the room and closed the door.

And high into the black, black void the *Hound of Heaven* sped, upward bound and outward bound on a mission to the ageless stars.

THE END

# OUR TURBULENT ATMOSPHERE

BY WILLY LEY



*First of two articles. Barely twenty-five miles up was the limit of observation until the rockets were built—but the basic science of planetary atmospheres, even more than that of weather, live above one hundred miles!*

Like many other people I occasionally experience some trouble in keeping Anaximander, Anaximenes and Anaxagoras neatly separated in my mind. I knew that one of the three had been the first to explain wind as "a flowing—river—in the air" but I was not sure which one. Upon looking it up it turned out to have been Anaximander, while Anaximenes had stated that "air is almost bodiless and must be without limit" and also, that "just like our soul, which consists of air, holds our bodies together, so air sur-

rounds all the world." And the third of that trio of similar names, Anaxagoras, had claimed that "air and ether originate from the mass that surrounds them and this is unlimited in extent."

These remarks reveal the first model of the atmosphere, if you want to call it that. It was a very simple model, wherever the soil or the water stopped, the atmosphere began and continued to infinity. Weather was caused by the interaction of air and water, prompted by the sun. And while attempts at

understanding the nature of these interactions failed, a number of "signs" were collected which were believed to indicate the next day's weather. Some of them were even valid, if only for the area where they were observed.

A few centuries later Aristotle, when putting all this information together, constructed the second model of the atmosphere. It was a curiously prophetic model, even though it was based on entirely erroneous assumptions. In Aristotle's model, too, the atmosphere extended from the soil to the fiery heavens. But it was no longer uniform as seems to have been silently assumed by the earlier philosophers. It was divided into three layers. The bottom layer in which plants, animals and people lived, was immovable as the earth itself, not counting these local currents which caused the weather. In temperature it was variable. The top layer, touching the heavens, moved with them around the earth and it was also intensely hot. The intermediate layer between the two did not move and was extremely cold—Aristotle knew mountainous regions and the temperature on mountain tops and may have thought that the higher mountains approached this middle layer.

After Aristotle there was little interest in the atmosphere among the "philosophers", the educated classes in our terminology, and what weather knowledge had been gathered slipped back into weather lore, becoming largely superstitious in

the process. We must remember that the interest in weather and weather phenomena is directly dependent upon the activities of the people concerned. The nomadic herder shows the lowest interest, if he and his sheep are drenched in a sudden storm, oh well, some god showed displeasure with something or somebody. And it did not matter much. The nomad's interest is confined to seasonal changes, provided that he lives in an area where seasonal changes are pronounced.

The non-nomadic planter of crops is greatly concerned about both, seasonal variations and day-by-day changes. But his concern is strictly localized, he is interested in what the weather will be in his locality tomorrow and the week after. The sailor, on the other hand, is not too deeply concerned about the weather in the place where he is, but would like to know what it will be at his distant port of arrival three weeks from now. But what really interests him is the weather in the intervening area during the intervening time. It is not surprising, therefore, that sailors had the largest amount of weather lore, plain and fancy, and that the sailor's weather lore differed from that of the peasant. It is also not surprising that the first really useful and comprehensive weather notes were systematically taken and collected by a sailor, the English "buccaneer" William Dampier.

That William Dampier was born in 1652, just nine years after Torri-

celli, a pupil of Galileo Galilei, invented the barometer, thus making the first step beyond Aristotle's collection of "signs" and observations, a time interval of just precisely two thousand years.

But during the time interval a third model of the atmosphere was hinted at by a learned Arab, probably the astronomer al-Biruni who died in 1048. The Arabs had taken Aristotle's works and become acquainted with the Greek conception of the earth as a sphere freely floating in space. On their own they had developed the idea that the stars must be distant suns and al-Farghani—called Alfraganus with a latinized version of his name—had stated quite plainly that even the smallest stars, those of the sixth magnitude, must be still larger than the earth itself. This suggested that our atmosphere might not reach all the way to the sun and to the stars. Since the Arabs also knew a good deal about reflection and refraction, either al-Biruni or one of his contemporaries tried to calculate the height of the atmosphere from the duration of twilight. The result was a figure corresponding to fifty-seven miles or about ninety-two kilometers. We now know that our atmosphere extends higher than that, but beyond a hundred kilometers it no longer has optical properties which could be detected without instruments.

Atmosphere model No. 3 was not very distinct in detail—or, more like-

ly, the full description was not preserved—but it was the first with an upper limit. Some five centuries later the newly invented "Torricellian tube"—the name "barometer" was employed for the first time by Boyle—hinted at the same thing. The vacuum which had been so hotly denied by Aristotle did seem possible after all and after climbing a few church steeples a Frenchman by the name of Perier carried the new instrument up the Puy-de-Dôme, a mountain in the Auvergne, to prove that there was less air pressure on top of the mountain. Incidentally, the mountain in question falls short of a mile by about six hundred feet. During the following decades there were many such mountain top expeditions, Pascal and Boyle produced theories about gas pressure, the actual existence of a near-vacuum was demonstrated experimentally by Otto von Guericke and the time was ripe for Atmosphere Model No. 4.

Its designer is well known by name, not because of his model of the atmosphere but because he denied Aristotle's notion that comets were atmospheric phenomena.

"Of all the comets in the sky  
There's none like Comet Halley  
We see it with the naked eye  
And periodically.

The first to see it was not he  
But yet we call it Halley  
The notion that it would return  
Was his, originally."

Dr. Edmond Halley was a man of many accomplishments. He read and used Latin, Greek and Hebrew and when his attention was called to a few presumably valuable Arabic manuscripts he learned and mastered Arabic in order to translate them. On the occasion of an expedition to Newfoundland the Navy lieutenant who had been assigned to him as a navigator, spoke insultingly behind Halley's back about the shortcomings of philosophers in general and of the ship's master in particular. When he repeated the remarks to Halley's face Halley had him confined to his cabin and sailed the ship back to England by himself. There, he prodded Newton into the writing of the "Principia," read all the proofs of the book, made most of the drawings and paid the expenses of publication. But Halley was at his best when it came to putting apparently unrelated facts together and drawing a conclusion from them, as in the case of the comet. In the case of our atmosphere Halley concluded from what facts he had that the atmosphere must have an upper limit and that it consists of three distinct layers. The limit he placed at forty-five miles. The bottom layer extended from sea level to nine miles and was characterized by a steady drop in temperature as one ascended in it. The second layer extended from nine to eighteen miles and was characterized by constant—and very low—temperature throughout. From eighteen to forty-five miles the tem-

perature was supposed to fall off some more, gradually and steadily. Except for the fact that the figures are too small, Halley's model is still valid in most respects.

His definite assertion about the atmosphere's upper limit must have spread widely and rapidly, presumably more through intermediaries than by direct translation. There is a very interesting passage in a long Latin poem, written in 1767 by one Bernardo Zamagna of Ragusa and published in Rome one year later. Its title is "Navis Aeria" and it is a description of an imaginary voyage round the world in a balloon—the actual invention of the balloon took place sixteen years later.

"Do not, however," the passage reads, "be lured to ascend too high nor aim by your ambitious flight to surmount the highest peaks of Atlas and Rhodope or the summit of towering Olympus, whose gleaming crest rises above the clouds. There the air has no density and an atmosphere which our race cannot breathe clothes the places far removed from earth; the higher it mounts toward the stars from the land below, the rarer, of course, it becomes and at a very lofty point seems to disappear altogether into nothingness." That was a far cry from the concept of Bishop Francis Godwin who only a century earlier had told that the "ordinary air" reached to the clouds and that the air above the clouds—and all the way to the moon—was so marvelously clear and clean and pure that

a traveler had neither the desire nor the need for food and drink.

During the short interval between Zamagna's poem and the actual invention of the balloon, one of the early chemists, Karl Wilhelm Scheele, had discovered that the air was a mixture of two gases and not a compound. Some nine years after Scheele, in 1781, Henry Cavendish published the result of numerous analyses: the air consisted of 79.17 percent—by volume—of nitrogen and 20.83 percent of oxygen. Four years later Cavendish found a strange discrepancy: a small bubble of gas was always left over when he forced all the oxygen and the nitrogen into chemical compounds which were not gaseous themselves. That was actually the discovery of argon, but since argon is chemically inert, Cavendish had no way of attacking or even identifying it. The whole problem was simply forgotten for more than a century, actually until 1894 when Lord Rayleigh noticed the strange fact that atmospheric nitrogen showed a density of 1.2572 while nitrogen gas prepared from chemicals had a density of only 1.2511. Logically there had to be something in atmospheric nitrogen which did not enter into the compounds of nitrogen. As impurities go it was rather massive, more than one percent of the nitrogen and almost one percent of the atmosphere taken as a whole. Lord Rayleigh and Sir William Ramsay found to

their surprise that it was a really inert gas, not just comparatively inert like nitrogen or carbondioxide. Remembering the Greek word for "lazy", namely *argos*, they called it argon. But the chemical investigation of the atmosphere is a later chapter which had to wait for two research tools yet to be invented in Cavendish's day: the spectroscope, which would detect and identify chemically inert substances; and the liquid air machine, which would reduce the atmospheric fluff to palpable liquids that could be handled and fractionated.

However, that early chemical attack on the various "airs"—gases—made by Scheele, Cavendish and others had led to the discovery of hydrogen and to the invention of the hydrogen balloon. The hot air balloon had preceded it by a month or so, but the hydrogen balloon could carry more and was more practical all around. The new research tool of the balloon replaced mountain ascents. It was much easier and faster for reaching the same altitude as could be reached by the laborious climb of nearby or not so nearby mountains. In fact it carried much higher than any mountain top in Europe. As early as 1804 Gay-Lussac reached an altitude of 7,016 meters,\* not quite attaining the

\*Since all measurements in meteorological work and high altitude research are now expressed in metric units I'll stick to the metric system from now on. For those who are not used to it: 1,000 meters are 1 kilometer, which is the same as 0.281 feet, while 5 miles are almost precisely 8 kilometers.



7,400 meters claimed by Robertson and Loest one year earlier. In retrospect one can only be surprised that these men survived their experiences, one should think that they would either have died of anoxia or frozen to death. In fact both came very nearly true. Regarded purely as altitude records these two flights remained unbroken for a long time. I have before me a list of such ascents prepared by a French historian of aviation and according to that list it was not until 1850 that even Gay-Lussac's record was broken. In that year Barral and Bixio ascended to 7,040 meters, but the difference is so small, especially for such an altitude, that it could be more than accounted for by a tiny error of instrument calibration. The record was certainly broken in 1862 by Coxwell and Glaisher whose instruments claimed 8,800 meters. In 1894 Berson succeeded in ascending beyond the 9,000 meter mark—his instruments read 9,150 meters—and the same Berson, flying with Süring, reached 10,800 meters in 1901. This was probably the highest flight in an open gondola from which the aeronaut returned alive to tell the tale, it required the air-tight gondola of the modern stratosphere balloon to go beyond 11,000 meters with relative safety.

All these high-altitude flights had been strictly scientific in purpose, the gondolas of the balloons were cluttered with barometers and thermometers, containers for taking air

samples, magnetic needles with various types of suspension for obtaining an indication of the earth's magnetic field, et cetera, et cetera. Some of these instruments were already of the type that did not have to be read any more by the aeronaut and they were even then misnamed "self-recording instruments" which is, of course, nonsense since the instrument does not record "itself", but its findings. The findings agreed nicely with each other. The composition of the air did not seem to vary noticeably between sea level and peak altitude. The drop in air pressure agreed with a formula which had been evolved and temperature fell off at a steady rate just as Dr. Halley had predicted. By, say 1890, the rate had been established too, Englishmen said that it was, on the average, one degree Fahrenheit for every three hundred feet of ascent. Frenchmen and Germans said that it was six degrees centigrade per kilometer—both mean the same thing. In addition to the observations from balloon flights a good deal of material from incidental observations of spontaneous phenomena had accumulated.

Scientists living in the Scandinavian countries had tried to measure the height of the aurora by triangulation. It is an undertaking which is more difficult by far than one may think at first glance. But they persevered and amassed figures the lowest of which read around eighty kilometers, the highest—with considerable uncertainty—

about five hundred kilometers. Of course nobody was quite sure then just what an aurora was, guesses ranged from electrical discharges to "a reflection of the reflection of sunlight, or even moonlight, on arctic snowfields". But no matter what the guess, the very existence of the aurora proved that there was still something in those altitudes. And then there were the shooting stars. Aristotle had held that they were purely atmospheric phenomena—the annoying similarity of terms like "meteorology", "meteoric" and "meteoritic" actually dates back to that assertion—but every once in a while somebody who did not worry about ridicule had wondered whether there might not be an astronomical reason for them. The fight was decided in favor of astronomical origin in the course of the first decades of the nineteenth century, but it was still true that the visible part of the phenomenon took place in the atmosphere. Professors Benzenberg and Brandes of Göttingen decided in 1798 to measure the height of shooting stars.

Now this was a fine and progressive resolution, but it was hard to carry out. While one can see a few shooting stars on almost any night they do not always appear where you happen to look at that instant. And with two observers at some distance from each other—in pre-telephone and even pre-telegraph days—the chances dropped sharply. In short Benzenberg and Brandes were not too successful, but as more and

more astronomers began to pay attention to the idea some useful chance observations were obtained. How much chance was involved, even after the introduction of photography, can be seen from the tally of Professor Max Wolf of Heidelberg: the total of the plates he had exposed between 1890 and 1902 amounted to six hundred twenty-five hours and thirty minutes of observation, between them the plates showed nineteen trails of shooting stars. Still, by 1900 astronomers knew that shooting stars usually become visible when they are between one hundred fifty and one hundred eighty kilometers high and that they disappear between eighty and one hundred kilometers. Of course the big ones will reach all the way to the ground.

And in August, 1883, the island of Krakatoa in the Sunda Sea exploded. That island had three volcanoes, Mount Perboewatan, Mount Danan and Mount Rakata. Mount Perboewatan had started erupting in May 1883, Mount Danan joined it in June and Mount Rakata on Sunday, August 26, 1883. After roaring, beginning at 1:00 p. m. local time, all afternoon and all through the night the volcano blew up at 10:05 a. m. Monday morning, obliterating the two other volcanoes and half of the island. The important point for our theme here is that an estimated cubic mile of steam, carbon dioxide, lava, ashes and soil were thrown into the air. Some of this material formed "noc-

tilucent clouds" which persisted for a long time and could be triangulated accurately and leisurely. Altitude eighty kilometers. The highest other clouds are the so-called mother-of-pearl clouds, forming at an altitude of about twenty kilometers. They are now believed to consist of ice crystals.

During those high altitude balloon flights of the nineteenth century there had been one which ended as a tragedy—as it turned out later it was just this tragedy which was to influence future research more than any successful flight had done. In 1874 two scientists, Sivel and Crocé-Spinelli had made a flight which carried them to 7,400 meters. During the following year they tried again, the name of their balloon was *Zénith* and Gaston Tissandier joined them in the gondola. They attained an altitude of 8,840 meters, just about the same as that of Mount Everest. But when the *Zénith* landed, only Tissandier was still alive, he had just narrowly escaped and is said to have been sickly for the remainder of his life. It was this ill-fated flight of the *Zénith* which caused meteorologists to do some fundamental thinking. The purpose of such flights was to obtain information about conditions at high altitudes. But that information was not obtained by the aeronauts themselves, it was obtained by instruments. Some of these instruments did not even have to be read but recorded their findings. So

why endanger human lives? Why not send up unmanned balloons carrying instruments only?

A man by the name of Brissonet made this suggestion for the first time—in 1879—and others took it up, pointing out that all the instruments one would probably use would still weigh less than a single aeronaut dressed in three fur coats, fur gloves, felt boots, et cetera. Therefore such unmanned balloons would rise higher. And they could also be much smaller and cheaper. In addition to all the men who wrote about this idea and talked about it there were a few which actually went to work, Gustave Hermite and Georges Besançon in France, and Professor Assmann and his assistants in Germany. Hermite and Besançon began by making their own balloons of oiled paper and by buying commercial instruments which they stripped of all excess weight. Later on they said that they had approached the problem as scientists but found that they had to become apprentice mechanics and could not reappear as scientists until after they had grown into full-fledged instrument makers. Their first successful *ballon sonde* ascended on March 21, 1893 near Paris and rose to fifteen kilometers. Assmann and his men either dawdled a bit or were too thorough, they were not ready until April 27, 1894. But their balloon rose to twenty-one point eight kilometers. Many more followed very quickly, none going much higher for a number of years,

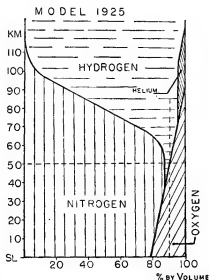
but each one contributing more and more information.

And based on this material the next model of the atmosphere was designed in 1898 by the French meteorologist Léon P. Teisserenc de Bort. Both he and Assmann had noticed that Halley's prediction of a constant temperature for a certain height, or rather from a certain height on, held actually true. In his book on meteorology Teisserenc de Bort used and advocated a two-layer atmosphere. The lower layer he proposed to name *troposphere*—using a Greek word which means “to turn”, but used here more in the sense of “to churn”—and all true meteorological phenomena, all “weather”, was supposed to take place in that layer. Since vertical currents would be absent in the upper layer the air in it would be stratified, hence the name *stratosphere* was proposed for it. The dividing shell between the two layers was to be called *tropopause*. The temperature of the stratosphere was established as being  $-55^{\circ}\text{C}$ . ( $-67^{\circ}\text{F}$ .)

It was already suspected at that time, and was fully confirmed in the years to follow, that the height of the tropopause depended on geographical latitude. There are seasonal variations too, but the figures usually given are: 6 kilometers over the poles, eleven kilometers at Latitude  $50^{\circ}$ —the latitude of Le Havre, Prague and Kiev in Europe, and of Vancouver Island and Winnipeg on this side of the Atlantic—and eighteen

kilometers over the equator.

Most of the two decades that followed after Teisserenc de Bort's publication were devoted to a patient filling in of detail into the picture which he and others had outlined. No major revolution was in sight—it would have needed something approaching omniscience to realize that Marconi's wireless, Lee de Forest's radio tube, Dr. Mach's researches on speed of sound, et cetera, the beginnings of scientific rocket theory and even the mass-production of machine guns all presaged revolutions of the sciences which are concerned with the atmosphere. That Sir William Ram-



*The distribution of atmospheric gases assumed in 1925 was necessarily based on theory and calculation. No observations above 30km. had been obtained.*

say in England had followed up Lord Rayleigh's discovery of argon by discovering helium, neon, xenon and krypton was interesting, especially in the case of helium because this gas was known since 1868 spectroscopically as occurring in the sun. On earth it remained hidden until 1894. But this was a filling in of detail, too. That aviation progressed nicely was a help, almost every flight could be combined with research.

For the sake of the aviators a set of tables of atmospheric properties in different altitudes was drawn up, it was useful to meteorologists, too. Although no aviator ever went to twenty kilometers the tables usually ended up with that figure since the material was available. Here's a slightly later version of these tables, from NACA Report No. 218, which, it may be remarked, is still valid and useful. The column "speed of sound" is, of course, a later addition, nobody thought that important in

1925 when NACA Report No. 218 was printed for the first time. Now it is, as everybody knows, important for establishing the Mach number, which is defined as the ratio of the true air speed of a plane, bomb, shell or missile to the speed of sound. If we call the airplane speed  $v$  and the speed of sound  $c$ , the definition looks like this:

$$M = v/c.$$

As a glance at the table shows,  $c$  varies with altitude and since  $v$  is likely to vary with altitude too, the Mach number  $M$  cannot be a constant value for a given plane or missile. That is known to most people interested in flying by now, but the vast majority of the people who know it believe that that has to do with the density of the air. The same glance at the table could have shown that this is not the case and in order to demolish the error let's define  $c$  in turn. To do it "from the bottom up" would require an extra page, so I'll proceed at once to the

TABLE I.

The Atmosphere from Sea Level to 20 kilometers, according to NACA Report No. 218, with speed of sound added.

Height km	Temperature °C °K		Pressure mm of Hg.	Weight kg/m <sup>3</sup>	Speed of sound in m/sec.
0	+ 15.0	288.0	760.00	1.2255	341
1	+ 8.5	280.5	674.09	1.1120	338
2	+ 2.0	275.0	596.23	1.0068	334
3	- 4.5	268.5	525.79	.9094	329
4	- 11.0	262.0	462.26	.8193	326
5	- 17.5	255.5	405.09	.7363	321
6	- 24.0	249.0	353.77	.6598	317
7	- 30.5	242.5	307.87	.5896	313
8	- 37.0	236.0	266.89	.5252	308
9	- 43.5	229.5	230.45	.4664	305
10	- 50.0	223.0	198.16	.4127	301
15	- 55.0	218.0	90.65	.1931	296
20	- 55.0	218.0	41.41	.0883	296

final formula which reads

$$c^2 = kRT$$

where  $k$  is the ratio of the specific heats at constant pressure and constant volume—just remember that the standard for  $k$  is 1.4 if you speak of atmospheric air— $R$  is the gas constant and  $T$  the absolute temperature. All of which works out to

$$M^2 = v^2/c^2 = v^2/kRT$$

which demonstrates that the Mach number actually depends on the temperature. We'll find out later at what point that concept has to be demolished too.

Before proceeding to the next Atmosphere Model—I'm beginning to grow hesitant about consecutive numbers at that point—let's get rid of a few necessary figures that should be mentioned. First, the chemical composition of the atmosphere, more or less within the confines of sea level to twenty kilometers. In dry air, at an intermediate latitude, and more than fifty miles from the nearest chemical factory, we have the following:

Nitrogen	78.09	vol. percent
Oxygen	20.95	" "
Argon	0.93	" "
CO <sub>2</sub>	0.03	" "
Neon	0.0018	" "
Krypton	0.0001	" "
Helium	0.0005	" "
Xenon	0.000008	" "
Hydrogen, less than	0.001	" "

Near the ground you can find a trace of radon, produced by radioactive decay. It never gets high, because it is a very heavy gas to begin with and decays to a lower

atomic number before convection currents can carry it up. Conversely, spectroscopic studies have shown that there is slightly more than one part in a million of CH<sub>4</sub>—methane—in a higher layer, tentatively put at eight kilometers. Similarly there are traces of N<sub>2</sub>O in the atmosphere and at a rather high altitude a fairly substantial amount of ozone, about as much as helium, but concentrated in a specific layer. Then there are strict impurities in the air, solid motes, about 100,000 per cubic centimeter in city air but only four hundred or so in the air over the high seas, far from land.

And then there is water vapor, the "humidity" of hot summer days. If our atmosphere were ever completely dry it would weigh  $5 \times 10^{15}$  tons—a 5 followed by 15 zeros—including the water vapor it weighs  $5.9 \times 10^{15}$  tons. Since air of a temperature of less than minus 40°—C or F—has no measurable moisture content any more, all that vapor has to be below nine kilometers. Incidentally, half of all the mass of the atmosphere is below five point six kilometers. And if sea level pressure prevailed throughout the atmosphere it would be 7,995 meters high, the so-called "ballistic atmosphere" which could actually be used for ballistic calculations in the good old days. They neglected the curvature of the earth's surface too and still got usable results.

Most of the things just recited were nicely put on paper at the time

of the first World War, with very similar figures. Meteorologists operated glibly if not always successfully with Highs and Lows, cyclones and anti-cyclones, isobars and isotherms and the force resulting from the earth's rotation. Then came the war and because machine guns had been mass-produced in the meantime the war settled down to fixed front lines and became a long war. The subsequent changes can all be traced to that one factor. I don't say that they wouldn't have come about anyway in the long run, but the way things actually happened they are all traceable to the long duration of the first World War.

Because of the war there occurred big explosions, not just gun fire and shells but the kind that resulted if somebody succeeded in blowing up somebody else's ammunition dump. What had been noticed occasionally before when a volcano put on a major performance now became a phenomenon for which one could wait: the "zone of silence". An ammunition dump blew up, everybody could hear it within a radius of ten or fifteen kilometers. To those at a distance of twenty kilometers the explosion was too far away to be audible. But at thirty kilometers it was audible again. Apparently something in the air reflected the sound waves to the ground again.

Because of the war communications, still mostly carried by cable, were severed—often literally—and "wireless" was pushed. It could be done and suddenly an engineer real-

ized that he had contact with another station far below the horizon. How could that be since radio waves were supposed to travel in straight lines? Presumably there was also a layer in the air which reflected radio waves. Strangely enough it worked better during the night. And sometimes, or so it seemed, the waves were apparently absorbed instead of reflected.

Because of the fixed frontlines, battleships were robbed of their big rifles which were mounted on railroad carriages and used for long range ground-to-ground work. While engaged in this, the artillerymen were reminded of the fact that the direction of the wind on the ground was not necessarily the same as the direction of the wind at three kilometers. That was in itself not new, but had not been thought of in this connection. The answer was very simple. A small unmanned balloon was released prior to firing and observed telescopically, it told the direction of the wind and gave an indication of its velocity. But what happened if you had a nice solid cloud layer at one kilometer? Officers of the United States Signal Corps had a fine idea. Small transmitters were already available—for airplanes—and they suspended such transmitters from their balloons, hoping to trace their path in spite of low-hanging clouds. It did not work as expected at first, but the idea was filed away for reference "after the war".

And because of the war neutral

Norway was in a nasty position. Norway had a large merchant marine and depended for much of its food on its fishing fleet. Both needed weather forecasts and needed them badly. But the weather of the belligerents was a military secret and the Chief Forecaster at Oslo—then still Christiania—had nothing to work with. The result was that he and his colleagues sat down and began to think. Just what did these Highs and Lows, et cetera, et cetera, signify? Well, supposing a cold river of air came down from the North. It was cold and therefore dry. It met a warm river of air from the South which was warm and could, therefore, hold a considerable amount of moisture. But where it met the cold river it was cooled off, could not hold its moisture any more. Then there occurred "precipitation". During the first World War, because of the war, they invented air-mass theory in Norway and because of its wartime origin it still bristles with terms like "stationary front", "advancing warm front" and "breakthrough".

Just before the war, a German, Professor Alfred Wegener, had indulged in some pure theory. Teisserenc de Bort had said, and every day proved it anew, that the troposphere was turbulent. The stratosphere was not, it was stratified. The theory of gas dynamics should enable one to calculate nature an extent of these strata. It was "most obvious" that the gases would separate according to their specific grav-

ity. Near the ground we had the standard mixture, but in the stratosphere nitrogen should become still more preponderant at first, until replaced in turn by hydrogen. Hence you had first the mixed troposphere, then the nitrogen stratosphere, above that the hydrogen sphere and above that the geocoronium sphere. Geocoronium was an unknown element, lighter still than hydrogen, forming the sun's corona. Like helium it might still be discovered in our own atmosphere.

The war delayed the acceptance of that theory for a while so that it did not emerge full strength until 1920-1925, although published originally in 1911. R. H. Goddard coupled a short recounting of that theory with a plea for rockets as research instruments. Svante Arrhenius enlarged upon Wegener's work and published a neat diagram (Figure: "Model 1925").

To tell chronologically what happened after 1925 would only result in confusion, it is now necessary to follow various lines of development without too much attention to their interference and to crossed wires. First let's dispose of the coronium and its assumed twin geocoronium. In 1911, when Wegener advanced the idea, there were still a number of holes in the Periodic Table of the Elements. By 1930 they were virtually all filled in and there simply was no room for the element coronium. But the corona was there and it emitted lines in the spectrum



which did not correspond to any known element, even though virtually every element was known. Hence the corona probably consisted of a known element which, because of—to us—highly unusual conditions emitted lines not known. To make a long story short, the unknown coronal lines and a number of others owed their existence to the emissions from “stripped” atoms, atoms which had lost some of their electrons. In the case of the corona a Swedish physicist, B. Edlén, showed in 1940 that the strongest coronal line, the so-called green line, which had been the cause of all the speculation, was emitted by thirteen times ionized iron, iron atoms which had lost thirteen of their normal twenty-six electrons. That ended coronium.

But Wegener's third layer, which he had called the hydrogen sphere, was established without the chemical implication and with a different name by Arthur Edwin Kennelly of Harvard and Oliver Heaviside of England. They proved that there had to be an ionized layer of air above the stratosphere. Logically it came to be called *ionosphere* and the shell dividing the stratosphere from this higher ionosphere was named *stratopause*. At first radio engineers, in order to honor the two men, called the “reflecting layer” above the stratosphere the Kennelly-Heaviside Layer. But there were some difficulties, it seemed to change altitude constantly, it seemed to disappear at times, in short it did

not behave properly. Part of which was due to the fact that experimenters did not always have the wave length they wanted at their disposal. Of course some outright mistakes were made too. And some unforeseen difficulties got in the way.

I know of one reflection experiment with a rather short wave length which sometimes worked nicely and not at all at other times. “Not at all” means just that, no signal was received at the other end and the party concerned telephoned asking in honeyed tones: “Pray, kind sir, why didn't you start your little transmitter on time?”, then repeating the sentence in somewhat different language. It turned out that they had picked the wave length which is characterized by maximum absorption in water vapor.

The outcome of it all was that the assumption of just *one* Kennelly-Heaviside Layer had been a mistake, there are several reflecting layers. The “D-Region” at about fifty kilometers will reflect only very long radio waves—20-500 kilocycles—and lets all others pass. The “E<sub>1</sub>-Region” at about one hundred kilometers reflects the wave lengths used for standard-entertainment-broadcasting, 500 to 1500 kilocycles. It is repeated at about one hundred sixty kilometers as “E<sub>2</sub>-Region”. Naturally none of these regions are sharply defined, the altitudes mentioned merely state where maximum ionization normally takes place. The

high frequency waves, 1500-30,000 kilocycles, are reflected by the "F<sub>1</sub>-Region" at about two hundred kilometers in daytime, and, if they are short enough to pass F<sub>1</sub>, by the "F<sub>2</sub>-Region" at two hundred eighty kilometers at night. During the day F<sub>2</sub> either disappears, or is full of holes, or changes altitude and blends with F<sub>1</sub>; it is largely a matter of interpretation and either one of the three explanations, or even all three, may be correct. Occasionally "erratic E" and "erratic F" has been detected traveling *vertically*, a behavior which might be compared to cirrus clouds suddenly descending quickly and merging with cumulus.

Since all these layers are regions of ionization and are ionized by energy entering from space these things are tied up with solar activity. The best one can say at this moment is that we would like to know much more and probably will in 1960.

And that brings us to the current Atmosphere Model of which it is frankly admitted that it isn't as definite by far as we would like it to be. But before its weaknesses can be pointed out, another development has to be discussed, because it led to something very important: modern instrumentation.

#### TO BE CONCLUDED

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## THE ANALYTICAL LABORATORY

Apparently the general reader reaction on the December issue was that, despite the natural comparison with the preceding, specially rigged, November issue, December produced a pretty fair crop of stories. I liked them myself, naturally—they wouldn't have been there if I didn't—so, of course, I agree with you, gentlemen! Anyway, here are the scores:

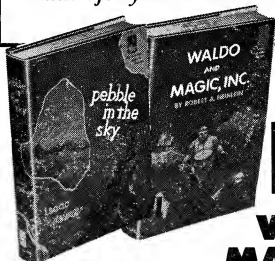
#### DECEMBER 1949 ISSUE

Place	Story	Author	Points
1.	The Witches of Karres	James H. Schmitz	2.19
2.	... And Now You Don't (II)	Isaac Asimov	2.27
3.	Gulf (II)	Robert A. Heinlein	2.71
4.	A Can of Vacuum	L. Ron Hubbard	3.57
5.	Reversion	M. C. Pease	4.19

Please notice that the first three places are practically a three-way tie, a terrific struggle indeed. And congratulations to Schmitz; his second story nosed out two of the toughest possible competitors!

THE EDITOR

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## CONFORMITY EXPECTED

H. B. FYFE

*That somebody was crazy was beyond question; the question was, however, who was off the beam—and where?*

Bill Lang peered over the pilot's head, his big hands with the wrench-scarred knuckles resting lightly upon the other's lean shoulders.

"Right one, Lou?" he asked.

"If I held Finley's calculation right side up, it is," answered d'Andrea.

He began to whistle a tune popular

when they had left Earth over three months earlier, thoughtfully dragging all the gaiety out of it.

The small, bluish planet on the telescreen was Kaolo, Procyon VI—they hoped. There was some possibility of error.

"I don't believe in spitting on blue-

prints I can't read," said Lang, hunching his heavy shoulders uneasily, "but could he go far wrong in only eleven light-years?"

D'Andrea drummed slim fingers on the metal surface of the control desk.

"No, even I can tell that it's Procyon," he decided. "I just hope we don't have to shuffle around from one planet to another to find the company's base."

"Why should we?" demanded a new voice. "Get us lost already, d'Andrea?"

Lang felt the pilot's shoulders stiffen. He removed his hands and turned to face the other member of the freighter's crew. Dave Finley, the astrogator, slid the door shut behind him and slouched into the room.

"I see I can hardly trust you long enough to go for an aspirin, much less to sleep an hour."

His voice was high and nasal, not quite a whine.

"What hurts this time?" asked d'Andrea unfeelingly.

Finley cast him a sullen glance. He ran a pudgy hand through his sandy hair and all but pouted. Lang diverted his own eyes uncomfortably from the pale face. It was becoming difficult to remember that Finley had not been well for more than a month.

He thought to himself that the Solarian Export Company could afford a spare man on the short-range interstellar ships. True, nearly everything but part of the thinking was done mechanically; but he, for

one, did not know how to weld together a worn out human nervous system.

Finley had been scaring them for some time. They depended upon him for locating landing places in the dead emptiness of space. With the magnitudes of interstellar distances and speeds, precise accuracy was required of an astrogator.

*But what if you know your astrogator is scared silly?* Lang thought, moving toward the door.

"I better get back an' see that everything's in working order for the landing," he muttered.

"Something wrong?" asked Finley sharply.

He peered anxiously at Lang. The mechanic noticed that perspiration was shining on the other's fleshy face.

"What's the matter, d'Andrea?" shrilled Finley. "You'll get us killed, landing with something wrong with the ship—"

"Nothing's wrong—with the ship!" said d'Andrea disgustedly.

"Calm down, Dave," said Lang.

"Calm down! How can I, with this pain in my shoulder?"

He fumbled at the loose collar of his shirt, breathing hard.

"Bill," said d'Andrea, still peering at the screen.

"Yeah?"

"I'll be busy in a few minutes. Keep him out of my way."

"Come on, Dave," wheedled Lang. "Help me check the automatics."

He gestured toward the door, but the astrogator shrank away. Finley backed against the cabinet containing

their spacesuits. He licked his lips and panted. With dilated pupils, he stared over Lang's shoulder. The pulse in his neck throbbed wildly.

"What's the matter?" asked Lang.

"You know what the matter is. Why doesn't one of you *do* something? No—you'd rather let us be killed!"

D'Andrea's red-gold head was bent over his dials. He fingered certain buttons on his control panel thoughtfully.

Finley crouched by the cabinet, looking trapped. Lang, watching him, felt uncomfortable at seeing his fear. The astrogator's continual worrying and complaining had made him hard to live with during the past few weeks.

Lang suddenly sensed trouble. Finley was motionless, but not really quiet. Beneath the surface was turmoil.

D'Andrea's fingers tensed. He pressed the buttons.

As they felt the vibration of the steering blasts, Finley lost all control. Howling, he flung himself at the pilot.

Lang grabbed him around the body, trying to pull him down. Without normal Earth gravity, however, his weight was of little use. Just before Finley had dragged them both to within reach of the control desk, Lang shifted and heaved him off his feet.

D'Andrea flicked a cool, blue glance over his shoulder, then returned his attention to the controls, the dials, the calculations, and the

time. They were on their way down.

About three hours later, d'Andrea contacted Solarian Export's station on Kaolo, and received directions to the company's reservation. They landed shortly thereafter.

Lang checked that Finley, strapped into his bunk, was all right. The mechanic tenderly pinched the bruised mark on his left forearm, to see if the bleeding had really stopped. Despite his effort to make allowances, he resented that.

"Fine thing," he grumbled to himself. "Bitin' a fellow you been livin' with. I shoulda hit him."

He went forward and found d'Andrea locking the controls.

"What are you gonna do, Lou?" he asked glumly.

D'Andrea pulled on a uniform jacket, shrugging his shoulders at the unfamiliar feeling after months in space.

"First thing," he said, "we'd better see the factor and ask him if he has an Earthman doctor here."

"That bad?"

"Sure. Look it up in the tables. He's out of his orbit."

"What if there ain't a doctor—how do we get back?"

"Get another astrogator somehow, unless you want to try it."

Lang grimaced and shook his head. They made sure Finley's door was securely locked, then opened an exit port. Leaving the ship, they discovered a small ground pickup waiting.

It was driven by a deeply tanned

Earthman. Beside him squatted a handsome, four-legged animal about the size of a leopard. Its fur was dark brown, with lighter areas on the round head. The gray color of the skin, showing on the pushed-in snout, was not disturbing; but to the Earthmen, the two tentacles growing from the back of the neck seemed disproportionately heavy.

"Don' pay no mind tuh them," said the driver, noting their stares. "Tha's whut they use fer arms."

"Kinda big for a pet, ain't it?" asked Lang.

The driver looked at him with an embarrassed, pitying smirk. He shrugged ruefully.

"I owe you an apology, James," said the Kaolan, in a humming but distinct voice. "Yesterday, I said *you* were stupid."

He stared at Lang and d'Andrea, smiling unpleasantly with pinkish teeth. Lang turned red and climbed into the rear seat. After directing a hard look between the Kaolan's black eyes, d'Andrea followed.

They were driven in silence to the one-story administration building. This was constructed of white rock and decorated with a few scrubby bushes, the largest form of vegetation in sight. The Kaolan jumped down with a heavy grace.

"Return to the garage, James," he told the driver. "Earthmen, my name is Munaaz. I will take you to the factor, Cowper."

They gave Munaaz their names and followed him into a wide hall.

They glimpsed several offices, with many of the desks occupied by Kaolans.

Munaaz padded into a large office, where he introduced them to George Cowper. The man in charge of this base of the Solarian Export Company was of medium height, lean, with sandy-gray hair and faded but alert blue eyes. Like the driver, he had a deep tan, and fine wrinkles around his eyes made his skin seem dried-out when he smiled.

"Thought you had three in the crew," he remarked, waving them to chairs.

"We have," said the pilot. "As a matter of fact, I'd like a word with you about that."

Munaaz settled himself comfortably on a leather-covered ottoman. He curled one forefoot stiffly downward, but seemed prepared to listen at his ease. D'Andrea looked annoyed.

"Do you have a doctor at the reservation here?" he asked.

"Of course. Your man got anything contagious?"

"No, it's not that," said d'Andrea.

"Kaolan doctors are much better," observed Munaaz.

He rose to push a button set beside the window. The opaqueness of the latter changed and Procyon's glare lit the office. From a tiny movement at the corners of Cowper's mouth, Lang realized that the factor suffered from Munaaz chronically.

D'Andrea surrendered to Munaaz's patience.

"To tell the truth, Mr. Cowper,

Finley seems to have a nervous breakdown, or something."

"No such thing, even in Earthmen," declared the Kaolan. "You mean he allowed himself to become mentally disorderly?"

*Disorderly!* thought Lang. *Cowper has a good poker face.*

Nevertheless, without actually changing expression, the factor gave the impression of being uncomfortable.

"An Earth psychiatrist is not permitted by charter," he said.

"Kaolans," announced Munaaz, "have great interest in the thinking processes of other forms of life."

Lang felt like something in a jar.

He wished that the Kaolan would stop swinging his tentacles to and fro, touching the tips in front and then behind his back almost like a man exercising with Indian clubs. In a minute, he supposed, Munaaz would want to know Finley's symptoms.

"How does your friend act?" asked Cowper, as if someone must.

D'Andrea told him. Lang added a few details.

"Needs a rest, I suppose," agreed Cowper sadly. "And I wanted you to take those precision tools over to Proeyon V."

"What?" D'Andrea demanded.

"Yes, for a colony the Kaolans are building up on the next planet."

"Just an experimental outpost," Munaaz assured them. "Of course, we are perfectly satisfied with our present location."

Lang wondered who cared, but he

noticed that Cowper accepted the remark as a matter of course.

"Well, I don't like risking it by myself," said d'Andrea.

Munaaz rolled dark eyes at him and patted his tentacle tips together six or eight times, with excited speed.

"Have a solution," he said. "Leave him here while you go to Uameed. Before you return, we will restore him to order."

"How do we get there?" objected the pilot.

"We will make a Kaolan astro-gator go with you."

"Well, don't *force* anyone on our account!" cried d'Andrea, his voice soaring to the defiant tone of a belligerent totem.

"It is a small thing," insisted Munaaz. "I myself could do it, being a mathematician."

"You?"

"Oh, yes. I studied the subject as part of a program to learn distances of outer astronomical bodies. Astro-gation would be simple."

They turned to the factor. Cowper said he had to admit that the Kaolans accomplished remarkable things in psychology. Lang sensed a hint of reservation, but Munaaz began a sales talk.

It was so simple. The Earthman astro-gator had merely become afraid, because of a mental conflict. He was fatigued, or unsure of himself. The Kaolans could find the trouble quickly. Very quickly. It would take perhaps five days to make the round



trip to Uameed. Finley would be recovered before then.

In fact, the Kaolans would blame themselves if he should leave in such an erratic condition. Conformity to normal straight thinking was expected on Kaolo.

"Go get your boy," advised Cowper, sighing. "While Munaaz takes him away and finds a substitute, I'll brief you on Uameed."

In the end, Cowper saw them off with a Kaolan named Yeeuli.

"Just take it easy, boys," was his parting advice. "Keep your screens focused and your transmitter quiet."

When the officious Munaaz had hustled off with Finley, the factor had thought the spacemen close to making some sharp remarks. He hoped they would change their attitude; but he rather feared they would not, especially upon finding Yeeuli just as typical of his people as was Munaaz.

It so happened that when they returned from Uameed, the fifth planet of Procyon, Cowper witnessed d'Andrea's landing from the doorway of the administration building.

"Not as good as he was last time," he murmured to himself.

He saw three figures scramble out of the exit before the pickup even reached the ship. One made for the vehicle, but the other two brushed it aside, clambered in, and left the first figure gesticulating in a cloud of dust. It immediately set out at a gallop for another part of the landing field.

Cowper sighed and returned to his

office. Presently, d'Andrea and Lang stamped down the hall and burst in on him.

D'Andrea pointed a shaking finger at the factor and opened his mouth. The words seemed to choke in his throat.

"You look," said Cowper mildly, "like a couple of young fellows who just found out that Kaolo is the official center of the universe."

The pilot swore. Lang merely growled wordlessly.

"You knew!" d'Andrea accused. "You could have told us what we were getting for an astrogator."

"Sunsports on the brain, that's what he's got," said Lang.

"They are all the same, boys," said Cowper.

"Doesn't seem to bother *you*," d'Andrea commented acidly.

"You can get used to anything," the factor told him. "As soon as you can say with a straight face that you really believe they have the inside orbit on the galaxy, you get along fine."

"Did you ever spend two weeks locked in with one of them? I was beginning to feel like a moron!"

"How smart *are* they?" asked Lang.

"Oh . . . about our equal, with less general information," said Cowper. "Trouble is, they are absolutely sure they are perfect, as well as being the very middle of everything. Some even object to a colony as far away as Uameed."

"Sacrilege!" quoted d'Andrea,

throwing up his hands. "I know. Yeeuli was against it."

"All right, so they're all super-novas!" complained Lang. "Why didn't he say we were dumb and let it go at that?"

"Oh, that would not be enough," said the factor. "You may be barbarian Earthmen, but you still have moral rights. Yeeuli was obligated to help you reach opinions that conform."

D'Andrea looked about as if he would like to spit. He slumped into a chair.

"Two weeks," he groaned. "Swinging those tentacles back and forth while he told me what was wrong with my mind!"

"Thought I'd let him 'adjust' my automatics," muttered Lang darkly. "Say, don't they ever sit comfortable?"

"You noticed that?" asked Cowper. "Just some folderol about maintaining awareness of their physical limitations, as near as I can gather from hints."

He allowed them to brood for a while, then suggested that they get back to their ship and requisition any supplies they might need for the flight back to Earth.

The spacemen got a ride out to the ship, saw to the necessary details, and slept. When they were summoned next to Cowper's office, it was still "afternoon" on Kaolo.

The factor had their papers ready, and said that Munaaz was bringing

Finley. In a few minutes, the latter pair arrived.

Munaaz and Cowper exchanged greetings, and everyone took a seat. Finley, like the Kaolan, chose one of the ottomans.

"How do you feel, Dave?" asked Lang.

"Better than I ever did before," replied the astrogator.

He crossed one leg over the other, pointing the foot stiffly downward. Lang thought he was still a bit nervous, although his sullen expression had vanished.

Munaaz turned to the other spacemen.

"Yeeuli is very discouraged with you," he charged.

"Likewise," said d'Andrea succinctly.

Munaaz exercised his tentacles with several swings.

"We are happy to accept your products," he began. "Some of them we have not had time to develop for ourselves."

"Oh, is that it?" commented the pilot sourly.

"Moreover, we would not refuse you enlightening contact with us. Why, then, did you lock Yeeuli into the observation dome?"

"He'd already played every music wire about three times," said Lang. "It was the only way we could get any sleep."

"Ah, so? But, on the whole, your behavior has us worried."

Cowper interrupted to suggest that it did not matter too much, since the Earthmen were about to leave for

their own system. He would arrange for them to pick up a cargo at a planet of a small star on their way.

"But are they competent to leave?" objected Munaaz. "One we cured, but—"

"Arrgh!" said Lang.

"You see?" Munaaz asked Cowper. "The one had what you Earthmen, judging from your recordings, would call an anxiety state. I do not feel satisfied that the others are normal."

"You must remember," said Cowper, "that on Earth, their abnormality would not be noticed, might even be an advantage."

"That may, unfortunately, be true," admitted the Kaolan. "It is another proof of our superior position. Nevertheless, we ought to help them to mold their thoughts."

D'Andrea had been fidgeting impatiently. Now he spoke.

"How about it, Dave? Want to check your things before we sign the inspection slip?"

"I suppose I had better," said Finley reluctantly. "I really do not feel like leaving here, but—"

"You will be back," said Munaaz, smiling encouragingly with his pinkish teeth.

Lang thought that the Kaolan's tone had been less impersonal than when he had spoken to the other Earthmen.

He and d'Andrea accompanied the astrogator out to the ship. Nothing remained to be done before leaving,

but Finley wandered about with a disapproving attitude.

"What's the matter?" asked d'Andrea finally. "Did Yeeuli hide your calculator?"

"No, no, a Kaolan would not do such a thing. But I feel that much about this ship is unsatisfactory. Besides, it is very foolish, now we are here, to go out again."

"Out?" repeated Lang.

"This is the center of culture of the universe," protested Finley. "Can you not feel it, even in your ignorance?"

Lang and the pilot exchanged glances.

"What did they say was wrong with you?" asked d'Andrea.

"Oh, that . . . I hardly remember how I felt before."

He saw their looks, as he seated himself on the deck.

"Honestly, fellows, you ought to have a talk with Munaaz. He could convince you—"

"—that I ought to stuff your head into one of the jets before we take off," exclaimed d'Andrea. "Look at him, Bill."

Finley was sitting comfortably except that he held one hand and forearm pointing stiffly downward, the forefinger extended toward the deck.

*The deck, Lang wondered, or the center of Kaolo?*

"Listen, Finley," he said, "are you sure you're all right? Can you figure your courses O.K.?"

Finley squirmed as if he would prefer to avoid the subject. D'Andrea immediately demanded reassurance.

"It will come back to me, no doubt," said Finley. "Could we turn on the record player? It is very depressing in here."

"What do you *mean*—it'll come back to you?" bellowed d'Andrea. "Don't you remember any astro-gation?"

Finley made a condescending gesture for silence.

"You would hardly understand," he said. "We have been parted only a few solar days; but mentally, I have lived much longer than that, backward and forward in my mind. It seems a very long time since I last worked an astro-gation problem."

D'Andrea flung his head back and spread his arms wide. Even his red-gold hair gave the impression of standing up.

"It will be all right," soothed Finley. "Of one thing I am sure—I can always find our way safely back here."

Lang felt a nightmarish numbness.

"Wait a minute, Lou," he murmured to the pilot, who was groping toward verbal expression by shaking a bunch of fingers under Finley's nose. "We better take it to Cowper. He can tell us if this is permanent."

Finley smirked at him pityingly, but made no objection to leaving the ship. He seemed, in fact, happier to do so.

Before reaching Cowper's office, d'Andrea regained the power of speech. He explained emphatically to the factor how they felt about go-

ing into space with an astrogator in Finley's condition.

The individual mentioned sighed and took on a martyred expression. Appearing to find the conversation oppressively quiet, he hummed a tune to himself and swung his arms casually back and forth.

"Just look at him!" d'Andrea finished. "Does he look as if he can think straight?"

Finley bridled slightly.

"I can think a good deal straighter than you, if you only knew it."

He stalked out of the office, swinging his arms indignantly.

Cowper turned to the others. For the first time since they had met, Lang thought he looked concerned.

"Listen, boys," he said. "My guess is he will stay that way. I have seen it once or twice before. They filled him so full of their ideas, at a time when he had been made peculiarly susceptible to them, that he hardly thinks humanly now."

D'Andrea swore.

"No need to take it that way. He is probably quite content. Just imagine how you would feel if you were accepted into a culture which set to rest all your doubts about the universe."

He squinted at them searchingly, the fine wrinkles around his eyes reminding them of his age.

"All your doubts," he repeated. "We all have some, but Kaolans just *know* the answers to everything."

"Personally," he continued, "I just keep my mouth shut and try to rub their fur the right way."

Good business. But the point now is what you want to do."

"What I *don't* want to do," declared Lang, "is trust him to get us home. I'd rather gamble on d'Andrea, from star to star."

"Can you dig up an astrogator anywhere?" asked the pilot.

"I can try," said Cowper. "Not many stop off here."

"While you do," said d'Andrea, "I'm going back to the ship and open a bottle we've been saving."

"Not something you bought here?" asked Cowper quickly.

"No, Earth stuff. Why?"

"Don't fool with the Kaolan products. There was an Earthman who

got left behind that way a few months ago—"

He hesitated and snapped his fingers.

"Say! He was a third officer on a big, deep-space ship. How much astrogation would he know?"

"Plenty," said d'Andrea promptly. "They stay out for years. Part of his job to know it, just in case."

"And you think he could get back to Earth from here?"

"Just tell us where to find him!" said the pilot.

Cowper told them that the spaceman, Steffens, had been given a room at the reservation to keep him out of further trouble. If not there, he



might be at the bar of the recreation building.

"We have him weaning on Earth-type beer," he called as Lang and d'Andrea whirled out of the office.

They hurried over to the living quarters, to be faced with a long hallway of similar doors. Lang saw a carton standing outside one. It was a box of canned beer. He knocked.

The door was opened eventually by a tall, yawning redhead, on whose chin glinted a golden red stubble. He was badly freckled, but well-mellowed.

"You, Steffens?" inquired the direct d'Andrea.

The redhead nodded amiably. He took the carton from Lang.

"Must have been delivered while I was busy," he drawled.

"Think you could compute a curve for Sol?" asked d'Andrea.

"Got about twenty or thirty pre-calculated," grinned Steffens. "Had time on my hands in this place."

"We're from that ship out on the field. We need an astrogator. I hear you could use a job."

Steffens apparently had been unemployed for some time. The promise of full pay convinced him. They took time only for a round of beer and to pack Steffens' few personal belongings, including a portfolio of calculations. Lang brought the beer.

Aboard the ship, d'Andrea asked how soon they could leave.

"From what I hear," said Steffens, "the sooner the better. That Kaolan

you had with you to Uameed is raising a stink."

"*He's* raising a stink!" exclaimed d'Andrea.

"You guys *are* air-tight in the head, aren't you? I heard there's talk of holding you up for observation."

"You want the job? Show us a curve!"

Steffens chose a course calculation from his supply, and laid the portfolio on the edge of the control desk.

"That ought to put us in position for interstellar drive."

D'Andrea immediately began to check his controls.

"Guess you'll be glad to get into space," said Lang.

"Sure am," Steffens said, stretching his long arms.

"Heard about our other man taking the cure?"

"Yeah. Gotta watch these Kaolans. They get you down."

"Been here long?" asked Lang.

"Just long enough to sober up and get my true bearings."

D'Andrea's attention was on his instruments, but Lang saw the new astrogator stop stretching and begin to swing his arms to and fro. The mechanic began to worry.

"You got a music player?" asked Steffens. "This place could use a little cheering up."

"It don't work any more," said Lang shortly.

Steffens shrugged. He began to potter about. Lang thought he was pale behind the freckles, perhaps growing sober.

"You close the port yet?" asked the redhead suddenly.

D'Andrea looked up.

"Not yet. Forget something?"

"No . . . I . . . that is—" He swallowed. "B'lieve I'll just step out for a breath of air—"

They watched him leave the control room. Then, with a sudden premonition of loss, both leaped to follow.

They found Steffens leaning dejectedly against the hull.

"What hit you?" demanded d'Andrea.

"Come on inside," urged Lang. "Here come Cowper and Munaaz in that one-lung taxi!"

Steffens shook his head silently. The pickup, guided by the same leather-faced driver, pulled up before them. Cowper and the Kaolan alighted.

"Where are you going?" asked Munaaz upon noticing Steffens.

"Nowhere, I guess," mumbled the redhead. "I needed beer money, but when I began to think maybe I couldn't get a berth back again, it didn't look so good—"

"What's the matter?" d'Andrea snorted. "We got the plague?"

Cowper raised a hand at him. Munaaz paid no attention.

"Of course, Red One," he said, smoothing his brown fur, "if you wish to go, it may be safe. You have had enough instruction to maintain your mental balance until you return."

"No . . . I . . . sorry, fellows," muttered Steffens, looking away.

"Guess I'm used to it here. B'lieve I'll go have a drink."

He trudged away without glancing back.

"Drinking is the one fault he retains," said Munaaz.

He stared contemplatively after the Earthman. Cowper took the moment to explain that Finley had begged for a job with the factor. The latter had been reluctant to waste the advantage it would give him in dealing with the natives.

"Well, I guess I'll get back to the office," he said. "I'll see you boys later. Coming, Munaaz?"

"You go ahead," suggested the Kaolan. "James can return for me."

When the pickup had left, Munaaz turned to Lang and d'Andrea.

"How do you feel?" he asked.

"What do you mean?" countered d'Andrea, as if he knew very well what was meant, and resented it.

"Are you at all disturbed mentally?"

"Only at not having an astro-gator," said the pilot.

"I cannot see how you can continue with that attitude."

"Honestly, we're just like millions of other Earthmen. Let's get inside, Bill."

"Take your time," muttered Lang.

He had been gazing sullenly at the slouching figure in the distance. Steffens reached the recreation building and disappeared within. Deep inside his stolid system, Lang was beginning to generate steam. Too many annoying frustrations, too

many obstacles. He wished he could pop off like d'Andrea, and have it over.

"Sometimes I wonder," he mused aloud. "I always thought of Earthmen as being normal, but who can say what's normal?"

"Interesting," said Munaaz. "It indicates hope for you."

"Oh, don't think Earthmen are dumb," said Lang. "We can take the facts when we see them. But how to get them?"

"What's bending *your* orbit?" asked d'Andrea.

"Do not interrupt him," said Munaaz, showing his pinkish teeth in a friendly smile. "I can see that all your Earth needs is someone to explain the proper view of the universe."

"But who could do it?" complained Lang.

"I could," mused Munaaz. "It is really my duty—"

"No!" shouted d'Andrea. "Whatever you two—"

"Oh, shut up, Lou!" said Lang, grabbing the pilot's elbow in a big hand and shoving him into the port. "We can't expect Munaaz to do it, even if he does know enough math to astrogate."

"Why, yes!" hummed Munaaz, whipping his tentacles rapidly back and forth. "Of course. What an opportunity!"

D'Andrea caught Lang's wink, and restrained himself.

"If you think you ought to, Munaaz," said Lang, "why not get aboard right now? Yeeuli left every-

thing you'll need. We can radio back to Cowper about it."

Munaaz admitted enthusiasm. To cure a whole planet of wrong thinking! On second thought, however, he decided that the idea would be unfair to his fellow Kaolans.

*Sometimes, thought Lang, it's better to be big than smart. I'm sick of this deep thinking and polite talk.*

He took a quick step to his right, whirled, and grabbed Munaaz around the middle. He heaved the dumfounded Kaolan off the ground and staggered into the entrance port.

"Bill! What—"

D'Andrea's curiosity was sidetracked as the still speechless Kaolan began to struggle, and the pilot was caught between Lang's back and the bulkhead.

"Earthman! Restrain yourself!" demanded Munaaz, seizing the edge of the inner doorway with a tentacle.

"I can't!" yelled Lang. "I don't know what I'm doing!"

He trod on the tentacle. Munaaz bleated and let go. Amid a great deal of thrashing about and thudding against bulkheads and furnishings, Lang and his captive juggernauted along the short corridor to Finley's old cabin.

D'Andrea, hands clasped over his solar plexus, staggered up as the mechanic succeeded in forcing Munaaz inside and locking the door. Lang turned the pilot to face toward the control room.

"Button her up and check for take-off," he ordered.



"Earthman!" called Munaaz, his humming voice muted by the metal door. "Listen to me! I must put your mind in order."

"What about the people of Earth?" demanded Lang.

"Yes," agreed the Kaolan. "That may be my destiny. But I must begin with you."

"I'll be back after take-off. Strap yourself in that bunk."

He went to the control room, where he found d'Andrea ready.

"You had me worried for a minute," said the pilot. "Think we can trust him to astrogate?"

"We still have Steffens' calculations," said Lang, strapping himself

into the astrogator's seat. "That's not all I wanted."

"What else?"

"The chance to see how a knight-all Kaolan makes out in a culture where *he's* the one out of step."

D'Andrea lifted the ship smoothly.

"You'll have to keep up some act, or you'll be 'cured'!" he murmured. "What can we say when we land on Earth?"

"Tell the same story we gave the Kaolans about Finley," said Lang vindictively. "What *they* can cure, *we* can cure!"

The image of Kaolo on the screen began gradually to shrink. Munaaz was on the way to his triumph.

THE END



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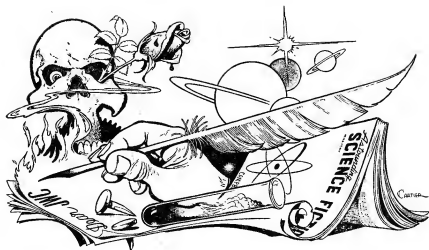
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## BRASS TACKS

*Chance remark from "Chance Remarks."*

Dear Mr. Campbell:

I found J. J. Coupling's "Chance Remarks" so interesting that I straightway tried an experiment along the lines suggested on the article itself. To keep it simple as possible I took merely the first word and then glanced through until I found it again and wrote down the word that followed. I was not particularly careful and may have overlooked the first repetition here and there, but the result is really amazing. I would have carried the thing farther save that I could not find the last word anywhere else, and as it stands, with the elision of only one

two-letter word—shown in parenthesis—and with the period which follows the last word in the text, it forms a complete sentence that not only makes sense but in a somewhat dogmatic manner settles the argument mentioned in the sentence in which the last word occurs.

To keep you in suspense no longer then, the sentence I obtained reads as follows:

*There can be about the text (as) much of the observer.*

Perhaps I should add that I did *not* deliberately "overlook" any words that should have been used in order to get a better construction. Yet I think that, aside from actually changing words, it would be hard to express the idea more euphoniously.

We frequently read in ASF of alien entities that influence the minds of men. Possibly such an entity, whom we might call Deamy Ocro for want of a better name, so influenced Mr. Coupling as he wrote the article that the above sentence came out as it did.—William Danner, 720 Rockwood Avenue, Pittsburgh 16, Pa.

*Emergency Communication Department.*

Dear Mr. Campbell:

My wife is seriously ill and I am trying to contact my son, David.

Knowing that, come what may, the one sure thing that David would always manage to get hold of, is Astounding SCIENCE FICTION, and that he always reads it from

cover to cover, I beg you to insert a note in Brass Tacks for me as follows: DAVID—Bunny ill. URGENT that you phone immediately. Much Love. POP

I know of no other means of contacting him; but I do know that this is a positive means of doing so.—David St. James, 60-07 100th Street, Corona, New York.

*Double three-way tie!*

Dear Mr. Campbell:

To call the November Astounding SCIENCE FICTION a "hat trick" seems a bit beneath the dignity of such an important event in the history of science-fiction; however, since one prominent amateur publication challenged you to pro-

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duce such a "hat trick" I shall term it the "Master Hat Trick".

The editorial on "S.F. Prophecy" was well put. Now I wonder what will be the results of thousands of us expecting ASF to go slick any month now. Or what will be the results of thousands of people, or hundreds of thousands realizing that science fiction is improving in quality and increasing in popularity at a rather rapid rate?

I should like to bring up some other matter. I'm desperately stalling for time—I want to escape rating stories this issue, but then I run into a psychological conflict with my long standing monthly habit. I tell you it's like smoking. What shall I do? I liked all the stories.

Incidentally, the club here has had a lot of fun calling each other names in a quiet sort of way since reading the installment of Heinlein's story. Now I'm back to rating stories! Well how about this one: First Place: Heinlein, Sturgeon, Asimov; Second Place: van Vogt, del Rey, de Camp. 'Bye.—Rosco Wright, 146 E. 12th, Eugene, Oregon.

*Rigging that November 1949 issue was fun! But thanks go to all the authors whose full co-operation was, of course, absolutely essential.*

Dear Mr. Campbell:

Thank you. Thank you many times over. Please express my sincerest gratitude to Messrs. Asimov,

Heinlein, Sturgeon, del Rey, van Vogt, and de Camp. Please thank C. Tarrant for me. My copy of the November, 1949 issue of ASF was even better than winning first prize on a quiz show. That autographed copy along with your letter are going to take their rightful place as my most treasured possessions as soon as I can find a safety-deposit vault to keep them in.

When I opened the magazine and saw the list of authors I blinked twice—not—I hang my head in shame as I admit it—because I recognized the connection between that line-up and my letter of last year, but merely in wonder that you had succeeded in getting so many of the top authors in the whole SF field into one issue. From now on I'll believe that you can do anything.

Speaking of that connection between my letter and the November 1949 issue: The unfortunate fact is I had completely forgotten the letter. The "remarkable coincidence" had to be called to my attention by a more observant friend. My face is even redder for reading the last paragraph of your editorial and wondering what you meant.

Now for a few corrections: It seems that I did Theodore Sturgeon a great injustice. Of the shorter pieces, I rate "What Dead Men Tell" a first place. There really wasn't much to it but ever since "Thunder And Roses" I have not been able to resist a Sturgeon story.

Lester del Rey with "Over The Top" places a close second. It was

another case of the longer story winning out. I also like del Rey. His characterization is more convincing, perhaps, than any author in the field.

Van Vogt next for "Final Command". The only kick I have is that his robot was too human. But then, that's what made the story. As a matter of fact, who am I to look a gift horse . . .? I also like van Vogt. He's hard to understand sometimes but even then I like him.

As I said once before, "How a yarn as enjoyable as 'Finished' by an author of de Camp's stature managed to be only"—last—"proves that the competition was KEEN." Needless to add, I like L. S. de C.

I was delighted to see the Rich-

ardson article, especially as I had been wondering lately what the latest thought might be on this subject. Very good.

As for the two serials: If I can't have Stuart, I am more than willing to get Asimov. Matter of fact, it was the gravest oversight on my part to leave him out of the other letter. He is one of my favorites, with or without his Foundation.

However, I can't rate the two serials because I have not read them yet. I like to save the serials until I have all of the installments. It saves wear and tear on my anxiety nerve.

Because I was so glad to see him back, I broke that rule to the extent of reading the first couple of pages

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of the Heinlein story. It looks great. For years Heinlein and Mac Donald were the epitome of ASF. I know every one of your readers will be glad to welcome him back.

The Rogers cover was not up to the Rogers standard of excellence. But, I still liked it. To tell the truth, within the next ten years I shall probably read the whole issue from cover to cover fifty times.

My deepest — nay, only — regret was the absence of Don A. Stuart. But then, he wasn't really absent, was he? Without him where would we be?

I hope Willy Ley is coming up soon.

There is one more thought I have concerning your magazine. Have you ever considered its tremendous educative potentialities?

It has affected my own life to an extent which is perhaps unmeasurable. I have been a constant reader since before entering High School. I have read every article and story which has appeared since 1938. I have read many which appeared before that.

I believe I owe to this reading the development of many interests which would otherwise never have been stimulated. I will have earned a B. S. by next spring which, in my opinion, would not have happened without ASF. That may sound strong, but it is sincere.

Reading ASF helps to develop a flexibility of mind and a wide variety of interests, which along with the understanding it gives in the

new fields of science and their relationships to our civilization, are invaluable. Men who must cope with the atom bomb, biological warfare, rockets, et cetera, need all these qualities, this knowledge.

And it's all so painless. I rather enjoy my lessons.

Thank you again for the splendid November, 1949 issue of ASF. You did a fine job, accomplished an almost impossible feat.—Richard A. Hoen, The University Club, 546 Delaware Avenue, Buffalo 2, New York.

*Most prophecy has minor slips in detail. It would be a stale world indeed if there were no room for variation of a prediction!*

Dear Mr. Campbell:

Heartiest congratulations on the November 1949 issue! I must admit that I didn't tumble to the gag till I read my *Fantasy Review*, the day after. Your line-up for the issue was terrific.

I must take issue with Mr. Hoen in putting Sturgeon's novelette in last place. It was definitely first, in my opinion. Although if the time machine you used hadn't been slightly unsynchronized, and Don Stuart's story had come through, I'll bet Sturgeon would have had to take second place. Van Vogt's story was second only because of the relative lengths.

One good result of the defect in the time machine was Asimov's Sec-

ond Foundation serial. If he keeps the same standard, this one will rival "Nightfall"—the best he ever did.

Please, Mr. Campbell, can't you get a good mechanic to fix that machine before the next issue? If you're too busy to work on Don Stuart angle, the announcement of a new E. F. Smith serial would be highly acceptable. To say nothing of *Unknown*.—Mrs. R. S. Brown, 401 S. 14th #7, Albuquerque, New Mexico.

### *Anticipation!*

Dear Mr. Campbell:

Well, the stage is set. All these months of silent preparation, broken

only by misty rumors, are finally culminating. Only three weeks till the November issue—THE issue!

You've played the game well, too—from the time of the publication of that imaginary issue letter in the November, 1948 issue; the evasive interviews with the top-drawer fans and fanzine editors; the poll, not so much to find out who reads ASF but to determine what kind of advertising is to be accentuated; promising to attend the Convention, but "unavoidably" missing it; the vague ad in the Convention program; the long but equally noncommittal telegram; the lack of a "In Times to Come" Department in the current—October—issue—first time I've ever known it to have been not carried

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in recent years; even the complete lack of outstanding yarns in the October issue is impressive. It would seem that it might make the November issue by comparison proportionately more effective.

Well, Mr. Campbell, all I can say to all this is simply, "It better be good!" Exclamation point!

Not that I found disfavor with the October issue. On the contrary, I found it most agreeable throughout, with .42 separating the first and the seventh place stories. (With 3.0—Excellent; 2.0—Very Good; 1.0—Good; .42 represents a mighty small margin of differentiation.)

The ratings:

1. Hubbard, "The Automagic Horse," 1.72

2. Davis, "The Aristocrat," 1.63

3. Neville, "Cold War," 1.57

4. Locke, "The Financier," 1.56

5. Jones, "Production Test," 1.48

6. MacLean, "Defense Mechanism," 1.34

7. Anderson, "Time Heals," 1.30

Issue rating is 1.51—mediocre for ASF.

In retrospect it would seem I underestimated the degree of merit in "Trojan Horse Laugh," rating it second to the Phillips yarn; meanwhile I've forgotten what the Phillips story concerned, whereas MacDonald's little classic remains vividly etched in my memory. As a matter of fact I'd rate it among the three best stories you've published this year.

Until THE next issue, then—Wm. N. Austin, 3317 West 67th

Street, Seattle 7, Washington.

*Hoen's prophecy required Heinlein's "Gulf" and "Cover by Rogers". "Gulf" was completed too late for the long color-plate process, so "... And Now You Don't" went in. But space limitations forced splitting "Gulf" to keep to the prophecy. Hence—two serials.*

Dear Mr. Campbell:

Well, it took the October 31st issue of *Time* to answer a question I had after reading the Editor's Page in the November issue of *ASTOUNDING*. To wit: What was meant by the last paragraph—"Like, for example, this particular issue of *ASTOUNDING SCIENCE FICTION*." I imagine that Dick Hoen was not only astounded but practically bowled over when he received his copy of the issue. Did you have much trouble getting Hoen's authors and story titles together along with Rogers' cover?

I will say that *Time* magazine seems to be waking up to Science-Fiction as a definite branch of literature. Not too long ago they reviewed one of the anthologies, and only a few weeks ago they mentioned the new monthly that is on the market. Has someone been educating the press and literature editors? Anyhow it's darned good publicity.

As for the November issue you sure packed it full of reading material. However it necessitated the

ASTOUNDING SCIENCE-FICTION



elimination of Brass Tacks, which is not to my liking, but I suppose you can't have your cake and eat it, too. BUT, why two serials? I am opposed to serials generally, although I know they are necessary occasionally, and you try to keep them to less than four parts. I can not see, however, two serials, even though you maintain the normal amount of complete stories in the issue. It just adds to the general tension when waiting from one month's issue to the next. Please, never again.

Concerning the stories, Sturgeon did an excellent job on a brand new approach to the small band of im-

mortals theme. An extremely well written story with a superb job of characterization. More along this line would be appreciated. The shorts were well written but the subject matter has been covered so many times that it seems that no new approach is possible and it's getting rather boring. I'll reserve judgment on the serials until they are completed and I have a chance to read them in their entirety, as that is the only fair way to judge. However, I hope that this time we find out where the Second Foundation is. It's hard on the nerves.—Sydney R. Scott, 1633 Roberts Lane, Falls Church, Virginia.

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## OF HUMAN MEMORY

(Continued from page 4)

hear in memory. Many can see in memory, but see only in black-and-whites. Some can not see at all, but can hear; finally there are some who can neither see, hear, nor feel in memory.

Now it's fairly obvious that if a man can not see a face in memory, he's going to have trouble recognizing people; if he can't hear in memory, he'll have a lot of trouble carrying a tune. How can he; he can't hear what he's trying to sing! But there are a horde of more subtle, but more important implications to this simple little observable fact that people remember in different ways. Psychometrists have developed a lot of tests that are intended to test for various psychic troubles—but it's important, in devising a test procedure, to know what your test is actually testing.

There's the famous Ink-Blot Test. It would appear fairly clear that that test would show a higher correlation to visual or nonvisual memory than to any other single factor in a man's make-up. The elaborate ESP experiments with clairvoyance, telepathy and the psi functions in general certainly need correlation with the subject's visual and auditory memory abilities. Musical ability may be present in a child—but if his audio memory is blocked, he can't apply it very well.

Finally, consider the case of three children, we'll call them Sam, who sees in memory; Henry, who hears

in memory; and Ned, who has both visual and audio memory blocked. In arithmetic and spelling, Sam has no trouble at all; when he wants to know what  $7 \times 8$  is, he sees the page of the arithmetic book in memory instantly, and reads the answer. Henry can't see it—but he can hear, in memory, some child reciting it. Spelling is just a question of seeing the word in a book somewhere for Sam, of hearing it spelled for Henry. But Ned has a tougher row to hoe; he has to remember *as a concept*, that "cat" is spelled see ay tee, and that  $7 \times 8$  is 56. Ned is, of course, rated as being somewhat stupid, he's so much slower learning.

Ned makes up for it later; by the time he reaches High School he's developed his conceptual abilities tremendously. Geometry, which requires understanding of concepts, not simply memory, is easier for Ned. And as a nuclear physicist, Ned would do fine; the concept of nuclear structure is as real and visualizeable to him as the concept of an automobile going down the street.

But the labor educational psychologists spend on "visual aids" is lost on Henry and Ned. A lecture series is much less helpful to Sam and Ned than to Henry. And all three children will be helped enormously if the educational psychologists will take time out, find which type of memory each has, and teach him the way to use that memory.

The Editor.



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